Health Care Financing

Grants and Contracts Reports

Profits, Growth, and Reimbursement Systems in the Nursing Home Industry

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Health Care Financing Grants and Contracts Report

Profits, Growth, and Reimbursement Systems In the Nursing Home Industry

This report was made pursuant to Contract No. 600-77-0069 between the Office of Research, Demonstrations, and Statistics/Health Care Financing Administration and the Health Care Study Center, Battelle Human Affairs Research Centers.

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TABLE OF CONTENTS

Page

Foreword vii
List of Tables xi
List of Figures. xiv

PART I. OVERVIEW AND BACKGROUND OF THE RESEARCH 3
- I. INTRODUCTION. 5
- II. OVERVIEW OF THE FOUR RESEARCH STUDIES 7
  - A. Reimbursement Policies and the Growth of the Nursing Home Industry: A National Study. 7
  - B. State Studies of Nursing Home Rates of Return 9
  - C. Riskiness of Investment and Rates of Return in the Nursing Home Industry: A Risk Study. 9
  - D. Vertical and Horizontal Integration and the Profitability of Nursing Homes. 11
  - E. Summary 11
- III. GOVERNMENT AND THE GROWTH OF THE NURSING HOME INDUSTRY. . 12
  - A. The History of Long-Term Care Legislation 12
  - B. The Growth and Changing Structure of the Nursing Home Industry 17
  - C. Expenditure Increases and the Involvement of Government 23
- IV. BASIS AND RATIONALE FOR THE RESEARCH. 27
- V. ORGANIZATION OF THIS REPORT 32

PART II. REIMBURSEMENT POLICIES AND THE GROWTH OF THE NURSING HOME INDUSTRY: A NATIONAL STUDY. 33
- I. INTRODUCTION. 35
- II. RESEARCH STRATEGY 37
  - A. Description of Reimbursement Systems. 38
    - 1. Flat-Rate Systems 38
    - 2. Cost-Related Systems. 39
  - B. The Appropriate Growth Period for Analysis. 41
  - C. Methods of Analysis 43
    - 1. Rationale 43
    - 2. Analysis Procedures and the Specification of Equations. 44
    - 3. Variables 47

Table of Contents (continued)

Page

III. DATA SOURCES 51
IV. RESULTS. 53
  A. Flat-Rate versus Cost-Related Systems. 53
    1. Expected Effects 53
    2. Empirical Results. 58
  B. Elements of Cost-Related Reimbursement Systems . . 62
    1. Prospective versus Retrospective 62
    2. Provisions for Profits 64
    3. Provisions on Depreciation 66
    4. Total Payment Limits 67
    5. Enforcement and Containment of Cost. 68
    6. Summary. 69
  C. Flat-Rate Systems. 69
V. SUMMARY OF FINDINGS AND CONCLUSIONS. 72

PART III. STATE STUDIES OF NURSING HOME RATES OF RETURN. 77
I. INTRODUCTION 79
II. DATA 81
III. STRATEGY FOR ESTIMATING RATES OF RETURN. 82
  A. Real versus Book Rates of Return on Capital. . . . 83
    1. Net Income 85
    2. Asset Value. 85
    3. Summary. 86
  B. The Rate of Return Base: Total Assets versus Owner's Equity. 87
    1. Theoretical Issues 88
    2. Empirical Considerations 90
    3. Evidence on Rates of Return. 93
    4. Summary. 95
  C. Adjusting the Accounting Treatment of Depreciation 96
  D. Adjustment for Inflation 99
  E. Specifications Employed in the Study 103

Table of Contents (continued)

Page

IV. EMPIRICAL RESULTS 106
A. Statewide Rates of Return 106
B. Differences in Rates of Return for Groups of Nursing Homes. 111
1. Type of Ownership 111
2. Rates of Return by Facility Ownership Status. 119
3. Rates of Return and Facility Characteristics 122
C. Rates of Return, Growth, and Reimbursement Policies. 127
V. SUMMARY OF FINDINGS, CONCLUSIONS, AND POLICY IMPLICATIONS. 128
A. Summary of Findings 128
1. Variation in Rates of Return Due to Alternative Adjustments 129
2. Variation in Rates of Return Across Nursing Home Groups 129
3. Variation in Rates of Return Across States. 130
B. Conclusions and Policy Implications 131
PART IV. RISKINESS OF INVESTMENT AND RATES OF RETURN IN THE NURSING HOME INDUSTRY: A RISK STUDY 135
I. INTRODUCTION 137
A. The Comparable Earnings Standard 138
B. A Risk Model 138
II. RESEARCH STRATEGY. 139
A. Risk and Reimbursement Systems 139
1. The Concept of Risk. 140
2. Risk and the Nursing Home Industry 141
3. Models for Measuring Risk. 142
B. Capital Asset Pricing Model. 143
1. Theory Underlying the Model. 143
2. The Empirical Specification of the CAP Model . 145

Table of Contents (continued)

Page

C. Estimating Risk in the Nontraded Sector of the Nursing Home Industry 146

1. The Predicting Equation. 147

2. Prediction of Betas for Nontraded Nursing Homes. 153

D. Summary of Research Strategy 154

III. DATA 155

A. Data for the CAP Model 155

1. Market Data on Publicly Traded Nursing Home Firms 156

2. Price Data on Risk-Free Assets 157

3. Price Data on the Market Portfolio 158

B. Data for the Predicting Equations. 158

1. Accounting Data from the Publicly Traded Nursing Home Firms 158

2. Accounting Measures for Nontraded Nursing Homes. 159

C. Summary of Data. 159

IV. RESULTS. 161

A. Estimated Betas of Publicly Traded Nursing Homes. 161

B. Risk in Nontraded Nursing Homes. 166

1. The Predicting Equation. 166

2. Beta Values of the Nontraded Nursing Homes . . 169

C. Summary of Results 180

V. CONCLUSIONS AND POLICY IMPLICATIONS. 180

PART V. VERTICAL AND HORIZONTAL INTEGRATION AND THE PROFITABILITY OF NURSING HOMES 185

I. INTRODUCTION 187

II. RESEARCH STRATEGY. 189

A. Rationale for Research Approach. 189

B. Empirical Specifications 192

1. The Form of the Equations. 192

Table of Contents (continued)

Page

2. Variables of Interest 193
3. Methods of Analysis 197

III. DATA. 197
IV. EMPIRICAL RESULTS 198
V. CONCLUSIONS AND POLICY IMPLICATIONS 201

PART VI. RESEARCH FINDINGS, CONCLUSIONS AND IMPLICATIONS FOR REIMBURSEMENT POLICY. 203

I. INTRODUCTION. 205
II. MAJOR CONCLUSIONS AND FINDINGS. 205
III. A CRITIQUE OF COST-RELATED REIMBURSEMENT. 208

A. Applicability of Cost-Related Reimbursement to the Nursing Home Industry. 208
B. The Costs of Capital and Some Conceptual Problems. 209

1. The Roles of Profit and the Rate of Return. 210
2. Risk and Reimbursing the Costs of Capital. 211

C. Some Practical Problems 212

1. Administrative Issues; Reporting, Monitoring, Policing. 212
2. Cost-Related Reimbursement System Incentives. 214

D. Summary 215

IV. PROPOSED MODIFICATIONS TO COST-RELATED REIMBURSEMENT 216
V. SUMMARY AND CONCLUSION. 224

PART VII. REFERENCES. 231

PART VIII. APPENDICES. 245

FOREWARD

This research project was an attempt to answer some questions about the relationships between reimbursement systems and the nursing home industry. The research concentrated on the interrelationships of reimbursement systems, rates of return to capital, profits and the growth of the industry in four separate but closely related studies. The effects of varying state Medicaid policies on the growth of nursing home beds were investigated in the National Study. The State Studies examined various rates of return computed from accounting data in four states to determine systematic differences across these states and across facility classifications. The risk inherent to investment in the nursing home industry was estimated and related to measurable financial characteristics of the industry in the Risk Study. Finally, an attempt was made to determine if integration was positively correlated to profitability among large integrated firms in the nursing home industry. The results of these studies were intended to provide additional evidence on these key relationships in the nursing home industry in order that policy makers would have greater knowledge for the development of plans for the reimbursement of nursing home services.

A critical empirical examination of the impact of reimbursement systems on the nursing home industry was clearly due. There have been over ten years of experience with various reimbursement plans in the several states. Until the Health Care Financing Administration began a series of studies, of which this project was a part, no systematic examination of the experience of those plans adopted by the states had been undertaken. The research staff of this project and the Battelle Health Care Study Center have welcomed the opportunity to be a part of this first major effort to examine state reimbursement systems and their impact on the nursing home industry.

Although the authors of this report assume the responsibility for what is reported here, the contributions of others have been substantial. The interest, encouragement, and suggestion on the research of Thomas Kickham, Ph.D., Project Officer from the Office of Research, Demonstrations and Statistics, Health Care Financing Administration, were especially appreciated. We benefited greatly from the cooperation in providing data and the practical insights on research issues offered by Paul Bellows from Georgia, Willis LaVance from Colorado, John Finn from New York State, and Gerard Duiker from Washington State. Numerous others have also assisted by giving access to data, by evaluating the work in progress, and by providing essential support services to the project. The professional staff and the dates of their active participation in the project are listed on the following page.

KMM
9/30/78

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LIST OF TABLES

Table	Title	Page
I-1	Population Growth, 1900-70 (in millions)	14
I-2	Trends in Selected Characteristics of Nursing Homes, 1963-74	19
I-3	Selected Data for the Medicare Program 1969-73	20
I-4	Growth Trends in Nursing Home Beds, By State, 1969-73	22
I-5	Source of Funds for Nursing Home Expenditures, 1950-77	24
I-6	Expenditures per Patient Day, 1967-77	26
II-1	The Variables Used to Describe State Reimbursement Systems	45
II-2	Variables Used to Control for Other Factors Influencing the Change in Bed Capacity in the Nursing Home Industry, 1969-1973	50
II-3	A Description of State Reimbursement Systems, 1969-73	54
II-4	List of Control Variables Considered for Growth Equations and Their Data Sources	55
II-5	Means and Standard Deviations of Noncategorical Control Variables	56
II-6	Results of Regression Equations for 1969-73 Changes in Bed Capacity and for 1973 Bed Capacity for Type of Reimbursement System	59
II-7	Results of Regression Equations on Residuals of Equation II-(1) for States with Cost-Related Systems	63
II-8	Results of Regression Equations on Residuals of Equation II-(1) for States with Flat-Rate Systems	70

LIST OF TABLES
(continued)

Table	Title	Page
III-1	Average Facility Book Rates of Return, By Rate Base, by Type of Ownership, and by State, 1971-1975	94
III-2	Average Facility Overall Rates of Return Before and After Adjustment for Zero Depreciation, By Type of Ownership and By State, 1971-1975	100
III-3	Simple Averages of Adjusted and Inflation Adjusted Overall Rates of Return for All Facilities, By State, 1971-1975	107
III-4	Simple and Weighted Averages of Adjusted Overall Rates of Return for All Facilities, By State, 1971-1975	109
III-5	Simple and Weighted Averages of Adjusted Overall Rates of Return for Proprietary and Nonproprietary Facilities, By State, 1971-1975	112
III-6	Mean Assets per Bed, for Proprietary and Nonproprietary Facilities, By State, 1971-1975	113
III-7	Simple and Weighted Averages of Adjusted Overall Rates of Return for Corporate and Noncorporate Proprietary Facilities, By State, 1971-1975	116
III-8	Simple Average Adjusted Overall Rates of Return for Proprietary Nursing Homes, By Ownership Status of Facilities and By State, 1971-1975	121
III-9	Partial Correlation Coefficients of Adjusted Overall Facility Rates of Return and Facility Characteristics for Proprietary Facilities, By State	124

LIST OF TABLES
(continued)

Table	Title	Page
IV-1	Accounting Risk Measures.	149
IV-2	Beta Values for 37 Publicly Held Nursing Home Firms, 1971-76	163
IV-3	Results of the Predicting Equation for Beta Values of 37 Publicly Traded Nursing Home Firms	166
IV-4	Means and Standard Deviations of Accounting Measures Used to Predict Beta Values, By Type of Nursing Home.	168
IV-5	Mean and Standard Deviation of Beta Values for Proprietary Nursing Homes By State.	170
IV-6	Display of Predicted Values Using Mean Values of Accounting Measures, By Type of Nursing Home.	171
IV-7	Median Value of Characteristics Used to Classify Nursing Homes By State	174
IV-8	Mean and Standard Error of Predicted Beta Values By Type of Ownership and Form of Ownership Organization for Proprietary Nursing Homes, By State	175
IV-9	Mean and Standard Error of Predicted Beta Values By Facility Size and By Occupancy Rates for Porprietary Nursing Homes, By State	176
IV-10	Mean and Standard Error of Predicted Beta Values By Debt to Asset Ratios and By Equity to Asset Ratios for Proprietary Nursing Homes, By State.	178
IV-11	Mean and Standard Error of Predicted Beta Values By Private Resident Days to Total Resident Days Ratios for Proprietary Nursing Homes, By State	179
V-1	Results of Regression of Rate of Return on Integration Variables for 29 Multifacility Firms, 1974-75	198

LIST OF FIGURES

Figure | Title | Page

IV-1 Distribution of Estimated Beta Values for 37 Publicly Held Nursing Home Firms 165

PART I

OVERVIEW AND BACKGROUND OF THE RESEARCH

OVERVIEW AND BACKGROUND OF THE RESEARCH

I. INTRODUCTION

The increasing involvement of government in the purchase of nursing home services has dominated the growth of the nursing home industry since the introduction of the Medicaid and Medicare programs in 1965. Since then both the scope and the method of this involvement have changed. Public expenditures for nursing home services increased tenfold between 1965 and 1975, from $449 million to over $5 billion, and in 1977 exceeded private expenditures by nearly two billion dollars.

Along with the great increase in public expenditures in the nursing home industry, the form of government intervention also changed markedly. Prior to 1965, government used extensively a straight payment-to-vendor system, based on the nursing homes' charge for services provided. The system relied on essentially the competitive nature of the industry to assure that prices would be kept at reasonable levels. However, with the advent of Medicare and Medicaid, more complicated payment systems were developed, which increasingly depended on the costs of the individual facility. Thus the determination of a reimbursement rate for nursing home services became more and more an administrative function of determining costs and less a matter of basing the rate on a market price. With this change, reimbursement policies began to create controversey and to focus on the problems associated with government intervention in an industry that has remained basically proprietary and competitive.

The new reimbursement systems brought several new problem areas to the long term care industry. There were problems associated with identifying which costs were allowable, how these costs would be determined, and what procedures would be adopted to determine allowed profits under reasonable cost-related schemes. There were general questions of measuring the cost of capital and of how to establish rates of return which would achieve the desired industry size. Further, the practical problems of administration of the new payment plans were compounded by the large numbers of small, diverse nursing home firms and long-term care facilities. Finally, there was little understanding on how various components of the increasingly complex reimbursement mechanisms affected the nursing home industry.

These several areas have been recognized as policy problems in the nursing home industry. There has, however, been little research into the issues involved in determining costs, profits, rates of return on nursing home investment, or on the effects of variations in reimbursement systems in the nursing home industry.

Thus, it has been the primary purpose of this research to begin to explore these problem areas, and related specific issues. Not all issues could be addressed, and accordingly, efforts in this project have concentrated on four related but separate studies of reimbursement systems and their relationships to the nursing home industry. First, we investigated the relationship between various elements that comprise a reimbursement system and the profitability of nursing home operations under the system. Second, we estimated the rates of return to capital for a sample of nursing homes in four states in search of the preferred method for using accounting data to estimate the capital base in nursing home investment and to seek out the dimensions along which rates of return varied. Third, we examined the relative magnitude of risk of investment in the industry, and how this risk varied among groups of nursing homes. Finally, we examined the relationship of profitability and measures of integration of firms in the nursing home industry.

Each of these studies was concerned with an issue related to profitability and returns to capital resources, although there is no single central theme across the four studies on the various aspects of reimbursement systems and the nursing home industry. The study efforts were designed to increase the understanding of how regulations and state Medicaid reimbursement systems affect the profits and growth of the nursing home industry and to produce research results that will help to evaluate the existing reimbursement methods and to formulate future policies on nursing home reimbursement and regulatory systems.

However, before proceeding to a detailed exposition of the studies undertaken in this project, a general overview of the objectives, research strategies and significances of the findings is set forth in Section II below. Some background on the nursing home industry and the government's role is also appropriate. Thus in Section III we briefly describe the history and current status of government's involvement in the industry as well as the growth and characteristics of nursing home firms. Section IV contains a general statement of the basis and rationale for this project. Section V, which outlines the balance of the report, concludes Part I.

II. OVERVIEW OF THE FOUR RESEARCH STUDIES

The primary focus of the research in this project was on the interrelationships of reimbursement systems, rates of return, profits and growth in nursing home beds. The specific aims of this research were to obtain answers to the following four questions:

(1) What was the relationship between nursing home profits and growth, and various components of nursing home reimbursement systems?

(2) What were the rates of return to capital estimated in different ways from accounting data for a sample of nursing homes in four states?

(3) What was the relative magnitude of the risk of investment in the nursing home industry?

(4) What was the relationship between profitability and measures of vertical and horizontal integration of firms in the nursing home industry?

In the process of the research, subsidiary and corollary questions and issues were also examined in each of the study areas represented by these four questions. The research, however, was conducted to a substantial extent as four separate but related studies rather than as a single integrated project. The four studies are briefly described below.

A. Reimbursement Policies and the Growth of the Nursing Home Industry: A National Study

The National Study was concerned directly with the impact of state Medicaid reimbursement policies on the profitability and growth of the nursing home industry. The primary relationship of interest was that of nursing home profitability to the components of reimbursement plans. The impact of reimbursement policy on several aspects of nursing home care, such as the quality of care, size of facilities, mix of funding services, and bed capacity certification were also considered in this study.

An analysis of the relationship between profits and reimbursement policy could not be undertaken directly because data on profits were unavailable. Hence this study examined the impact of reimbursement plans on the growth of nursing home beds, and by extension the profitability of the industry. The rationale for this approach was that state reimbursement policies affect the profitability of nursing homes, which in turn influences the rate of growth of the nursing home industry. Unless other factors were adversely affecting the industry, the number of nursing home beds will increase more rapidly in those states in which the reimbursement systems permit larger profits to be made than will occur in other states. Certain implications about the growth of the industry across states could therefore be derived by examining the different elements of state reimbursement systems and their expected effects on profits.

Specifically, we examined systematically the reimbursement schemes and growth experiences of all states between 1969 and 1973 to determine how different components of the reimbursement systems affected the growth of the nursing home industry during that period. Other factors that might affect the quantity of nursing home services, such as per capita income and percent of nonwhites in the population, were included as "control" variables.. Equations were then estimated using multiple regression techniques. The estimates obtained were used to identify the influence of particular elements of a reimbursement system on the number and growth of nursing home beds, and thus which element tended to increase or decrease the rate of return on nursing home capital.

The results of the National Study, by identifying those reimbursement systems and elements within each system that encouraged or discouraged growth in the number of nursing home beds, and thus tended to increase or decrease profits, will be useful in the further development of reimbursement systems. Our findings will provide empirical evidence especially to assist in the evaluation of the intuitive arguments for or against various elements of reimbursement systems. Policy makers can more effectively assess the consequences, if any, of a reimbursement system on profits, and thus better understand the scope of activities for bringing about desired changes in the nursing home industry.

B. State Studies of Nursing Home-Rates of Return

The State Studies were undertaken to estimate the average rates of return on investment received by different classes of nursing homes in Colorado, Georgia, New York and Washington. Income and expenditures and balance sheet data in 3067 usable cost and financial reports submitted by 949 facilities to the state Medicaid agencies in each state were used.

We used the accounting records of these nursing home (i) to show that rates of return based on total assets are preferred to rates of return on equity for purposes of reimbursement; (ii) to demonstrate that book rates of return can be adjusted to obtain rates of return that more closely approximate the real returns in the nursing home industry; (iii) to estimate rates of return on total assets for nursing homes in the four states; (iv) to compare estimated average rates of return across states and nursing home groups within states; and (v) to examine the relationship among estimated rates of return, rates of growth, and reimbursement policies in these four states.

Knowledge of ex post rates of return is useful for several reasons. One reason is to establish benchmarks for the rates of return required to encourage or retard industry growth. Further variations in rates of return will influence which types or groups of facilities will expand and which will contract. Thus determining if rate of return differentials exist across different types of facilities or sectors of the industry will provide empirical evidence by which reimbursement and regulatory agencies can evaluate the changes taking place in the structure and organization of the industry. Finally, the rates may reflect the effects of different reimbursement systems, and accordingly provide the basis for more informed choices on elements in the reimbursement plan.

C. Riskiness of Investment and Rates of Return in the Nursing Home Industry: A Risk Study

The Risk Study attempted to estimate the relative risk associated with investment in the nursing home industry. Reimbursement for capital, which includes a risk premium, is critical to assuring continued investment at desired levels. The "normal rate of return" on equity capital depends upon the extent of risk involved; high risk activities require higher rates of return than activities with low risk. Empirical determination of risk in investment, however, is complex and only in recent years has the problem been systematically addressed in the finance literature. We used the "Capital Asset Pricing Model," which is based on sound theoretical foundations and is amenable to empirical determination. The issue or risk associated with investment in nursing homes was addressed in a three-part analysis based on this model.

First the Capital Asset Pricing Model was estimated using stock price information for each publicly held nursing home corporation for which such information could be obtained between 1971 and 1976. The measure of risk for each corporation was found by examining the responsiveness of the firm's rate of return to the level of market activity. Second, since only a small percentage of the industry was publicly traded firms, the question remained whether these risk measures truly reflected the risk associated with the nursing home industry as a whole. To address this question, the estimated risk measures of the publicly traded corporations, using regression techniques, were related to financial variables that were known to influence risk. Third, the estimated relationships between the measure of riskiness and the financial characteristics of the publicly traded firms were extended to sole proprietorships, partnerships, and closely held corporations in order to predict the relative risk associated with investment in these different classes of nursing homes.

The usefulness of the Risk Study and its results lies in evaluating the relative riskiness of investment in the nursing home industry and in the implications for paying either a negative or positive premium to nursing homes. A crucial part of a plan to pay for nursing home services is that investors in the nursing home industry are compensated for the investment risk they bear. Further, since the measures of risk associated with investing in different classes of nursing homes can be used, along with other available data, to estimate expected market rates of return, there is a need to consider how, if at all, the risk premium should be taken into account in a reimbursement plan for nursing home care.

D. Vertical and Horizontal Integration and the Profitability of Nursing Homes

The Vertical and Horizontal Integration Study was made to examine concerns over excessive profitability among large integrated multi-facility firms in the nursing home industry. This study tested the hypothesis that profitability was positively related to the extent of integration, using data from financial reports on publicly held nursing home corporations. In particular, estimates of profitability were regressed on measures of horizontal and vertical integration as well as a set of control variables.

Although the extent to which the state Medicaid reimbursement systems have contributed to profits higher than normal among vertically or horizontally integrated firms was important, the scope of this study was limited. The attempt was made to confirm only whether profitability increased with the extent to which the firm was integrated. The limited inquiry was directed to determining if there was evidence to support the hypothesis that integration was positively related to profitability. The study was not intended to establish whether any specific relationship between integration and profitability was due to the state Medicaid reimbursement systems or due to other factors. The findings of the study, however, would be potentially useful for assessing changes in the reimbursement systems designed to affect the trend toward larger, integrated nursing home firms.

E. Summary

In summary, the scope of this research effort included the examination and analysis of the relationships between reimbursement policies and the profitability of the nursing home industry on the basis of related but separate studies. These study efforts have been designed with a view to increasing the understanding of how regulations and state Medicaid reimbursement systems affect the profits, rates of return, and growth of the nursing home industry. The project as a whole was organized to produce research results which will directly help to determine methods for paying for nursing home care under the Medicaid program.

III. GOVERNMENT AND THE GROWTH OF THE NURSING HOME INDUSTRY

The growth of the nursing home industry has been closely tied to the extent to which government agencies have subsidized long-term care. The availability of public funding has been governed by legislation enacted by both federal and state governments. This legislation and its consequences are sketched below. First, the history of legislation relative to long-term care is set forth. Second, the growth and changing structure of the nursing home industry are discussed. This section is concluded by considering some of the consequences of the increased involvement of the government in the nursing home industry.

A. The History of Long-Term Care Legislation

At the turn of the century the aged were usually cared for by members of their family or by close friends. Those in need of institutional care often became wards of the state and lived in county almshouses or poor farms. Some states, 18 by 1931, began to provide direct cash assistance to the elderly [11].[1] However, the depression of the 1930s reduced state revenues and increased the number of elderly with no private means of support. The states turned to the federal government and Congress enacted into law the first major federal subsidies for long-term care under the Social Security Act of 1935. Title I of the Act established the Old-Age Assistance program (OAA), which authorized limited federal matching funds for cash assistance to the needy elderly.

The Old Age Assistance program was the first attempt by government to affect the quality and institutional structure of the long-term care industry through selectively channeling its buying power. Federal involvement not only increased the demand for long-term care services but also encouraged the growth of proprietary homes. Only older persons who were both poor and did not live in public facilities were eligible for Old Age Assistance monies. These OAA payments helped to subsidize the costs of care,and, therefore, the growth of private homes. The continuation of the existing poorhouse systems was discouraged.

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[1] All references are listed in Part VII of this Report.

The federal government further influenced the development of the nursing home industry in the 1950s. Consistent with the initial approach to improve the quality of care, OAA matching funds were withheld from states that failed to establish licensing and inspection programs for nursing homes. Most states promptly complied, and the number of private homes declined sharply, because many could not meet the licensing standards.[2] The long-term growth trend of the industry, however, was not affected. Both the rapidly rising number of people 65 years of age and older (Table I-1) who increased the demand for long-term care services, and other changes in the role of the federal government in support of the care of the elderly promoted further expansion of the industry. In particular, the federal government authorized direct payments to vendors for services to properly placed eligible recipients, a third-party payer arrangement that increased the certainty of revenues for the providers. The prohibition against payments to residents in public facilities was dropped. Further growth incentives were provided through capital construction grants and low interest rate loans. The 1946 Hill-Burton Act, which provided assistance for the construction of public and nonprofit hospitals, was amended in 1954 to include nonprofit nursing home facilities. At the same time, both the Federal Housing Administration and the Small Business Administration made low interest rate loans available for building proprietary nursing homes. It is not surprising that these factors, along with general prosperity and societal changes, led to a tenfold increase in the number of nursing homes in the country between 1939 and 1963, an increase from 1200 to 12,800 in 25 years. The bed capacity during the same period rose from 25,000 to 568,560, a twentyfold increase [74].

In 1960 a major shift took place in the role of the federal government with respect to financial support for nursing home services. The

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[2] No very precise data are available on the impact of these new regulations. Some states had already begun licensing. In those that had not, the level and type of standards did determine the number of homes that closed their doors. In Washington State, the number of homes declined by nearly 15 percent between 1951 and 1953, following the new state licensing law [59].

TABLE I-1

POPULATION GROWTH, 1900-70
(in millions)

Year	Total Population	Population 65 and Over	Percent of Total Population
1900	76.0	3.1	4.1
1910	92.0	4.0	4.3
1920	105.7	4.9	4.7
1930	122.8	6.6	5.4
1940	131.7	9.0	6.9
1950	151.7	12.3	8.2
1960	178.5	16.6	9.3
1970	203.2	20.0	9.9
1985	(estimated)	25.0	

Source: Bureau of the Census, as reported by the American Nursing Home Association [9, p. 13].

Kerr-Mills Amendments to the Social Security Act provided for the specific allocation of matching funds for nursing services under a new program called the Medical Assistance for the Aged (MAA). This program provided health services, including skilled nursing services, to the medically indigent, and introduced a categorical in-kind program to the long-term care industry for the first time. Although under these 1960 provisions a state could choose to provide payments for nursing services to its MAA program, many did not. It was in 1965, after Congress enacted Titles XVIII and XIX of the Social Security Act, that states were required to provide nursing services for medically indigent persons over 21 years of age if federal matching funds were to be received. Title XIX, Medicaid, was a specific extension of the Kerr-Mills Amendments.

Both Title XVIII (Medicare) and Title XIX (Medicaid) brought substantial change in the conditions affecting the nursing home industry. Medicare, which is a health insurance program for retirees with Social Security retirement benefits, introduced for the first time a totally federal program. The regulations and reimbursement policies were well defined from the beginning of the program. Nursing home benefits for those eligible under Medicare were restricted to 100 days following hospitalization. To become a nursing home eligible to receive Medicare funds, a facility had to be certified by the Social Security Administration in accordance with a number of standards universally applicable across the states. Because skilled nursing care in nursing homes under the provisions of Title XVIII was considered a lower cost alternative to extended hospital care, the Medicare eligible nursing homes were called extended care facilities (ECF). These facilities were expected to provide essentially the same quality of care that a hospital would provide for convalescent patients no longer requiring acute care. Furthermore, nursing homes were reimbursed for the care of Medicare-eligible patients on a reasonable cost basis quite similar to the reasonable cost basis used in paying for hospital care [25].

Health services and nursing home services under Medicaid were state programs supported in part by federal matching funds. Title XIX left the scope of services to be provided, the definition of a nursing home facility, and the method of reimbursement for the care provided, to the jurisdiction of the states. Since the needs, resources, and other circumstances varied substantially across the states, a great many differences in the Medicaid programs, including policies with respect to nursing home care, began developing among the states. Subsequent federal legislation has been directed towards obtaining greater uniformity in the Medicaid programs of the states.

In the last ten years, two major pieces of federal legislation have materially affected the state Medicaid programs and the nursing home industry in particular. These Acts, the 1967 and 1972 amendments to the Social Security Act, continued the approach of the federal government to affect the quality of care and the institutional structure of the nursing home industry through the authority to withhold matching funds. Under both Acts, federal involvement in specifying standards of care and the nature of reimbursement policies substantially increased.

In the 1967 amendments to the Medicaid provisions, a skilled nursing facility (SNF) and skilled nursing care were defined, and minimum standards set. The states, furthermore, were required to make periodic evaluations of the care provided by conducting on-site inspection of facilities and were enjoined to enforce the minimum federal standards. At the same time, Congress created intermediate care facilities (ICF) under Title XI of the Social Security Act. These facilities were designed to provide services to public assistance recipients, who, while requiring some long-term institutional care, did not require the more intense skilled nursing care of a SNF. The states were left to define the ICF standards using federally specified minimums. In general, the difference between skilled and intermediate care revolved around staffing hours on the facility site and the level of training of nursing supervisory staff.

The amendments of 1967 also established some general "reasonable cost" guidelines for the setting of Medicaid reimbursement rates for nursing home services. No specific criteria were set, nor were upper limits specified. Through administrative regulations, the use of Medicare reimbursement rates as upper limits for Medicaid reimbursement was established. Although this action was challenged in court and subsequently upheld, the provision was written into the law in 1972.

The legislation, signed into law in December 1972, substantially amended both the Medicare and Medicaid provisions in the Social Security Act. The law dropped the use of the ECF and provided a single set of standards for skilled nursing care under both Medicare and Medicaid, and thus eliminated confusion over skilled nursing care standards to be applied for certification of ECF's and SNF's. The new set of standards referred only to care in skilled nursing facilities. Facilities desiring only Medicaid certification were required to meet the Medicare standards, unless the state chose to implement more stringent regulations. In addition, intermediate care provided for under Title XI in 1967 was consolidated under Medicaid, and limited nursing services required. States were also instructed to implement programs to control utilization of services. Finally, major changes were provided in the reimbursement systems along with other restrictions on rate setting. Congress mandated that the payment by Medicaid for skilled nursing and intermediate care be established on a reasonable cost-related basis. The Secretary of the U.S. Department of Health, Education, and Welfare was charged with providing reimbursement guidelines for the states to follow. The 1972 law gave the Secretary broad new powers to set maximum allowable costs based on an assessment of the costs necessary for efficient delivery of services. These guidelines on reimbursement and other regulations were to be prepared in order for all the states to implement an approved cost-related reimbursement system for nursing home services by July 1, 1976. The effective date for implementing the mandated systems was subsequently changed by regulations issued by the Secretary, to January 1, 1978. Although all states have yet to complete the full implementation of all provisions and regulations under the 1972 Social Security Act amendments, for the most part, nursing home services were being paid, nationwide, on a cost-related basis in 1978.

B. The Growth and Changing Structure of the Nursing Home Industry

The major growth periods in the nursing home industry have closely matched the periods of increased financial support from the federal government. Although the 1935 Social Security Act was primarily a response to depression conditions, the cash assistance program for the aged contributed substantially to the early development of a private sector in the long-term care industry. Both federal and state support continued in the 1950s. As indicated above, the number of facilities and beds increased tenfold and twentyfold, respectively, between 1939 and 1963. But the major expansion of the industry took place in the next 10 years, during which the increase in the number of beds was substantially greater than the number of nursing home beds in the country in 1963. The decade of the sixties, and the first years in the 1970s saw the beginning and rapid development of the long-term care industry in conjunction with the implementation of the Medicare and Medicaid programs.

Table I-2 sets forth data on selected characteristics of the nursing home industry for the period 1963-74. After 1969, the number of homes increased only nominally after an annual growth rate of 3.06 percent from 1963 to 1969. However, the annual rate of increase in beds fell slightly from 8.99 percent before 1969 to 8.27 percent after that year. Admissions over the period, 1963-74, rose nearly 12 percent annually, but tapered off in the last half of the period to only 4.10 percent annually. Although data were not collected on facility and bed growth annually, the maximum rates of growth were probably 1965 to 1970.[3]

The gross aggregates hide at least three important considerations. First, there are differences in the growth patterns of the various long-term care services under the Medicare and Medicaid programs. Second, the rates of growth in nursing home beds per 1000 elderly citizens varies substantially across the states. Finally, the industrial structure and size of homes have been changing.

The number of facilities and the number of beds participating in the Medicare program have declined steadily since 1969, even though the industry has grown. Table I-3 summarizes the Medicare experience between

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[3] See the rate of growth in expenditures on nursing home services discussed below. Note also data compiled by the American Nursing Home Association [5].

TABLE I-2

TRENDS IN SELECTED CHARACTERISTICS OF NURSING HOMES, 1963-74

Selected Characteristics (Number)	Data Period			Average Annual Percent Change		
	1963	1969	1973-74	Between 1963 and 1969	Between 1969 and 1973-74	Between 1963 and 1973-74
Nursing homes	12,800	15,340	15,700	3.06	.58	2.06
Residents	457,050	778,290	1,075,800	9.28	8.43	8.94
Beds	510,180	854,910	1,174,800	8.99	8.27	8.70
Admissions[a]	358,480	946,020	1,110,800	17.56	4.10	11.97
Discharges[a]	339,260	872,250	1,077,500	17.05	5.43	12.25
Deaths[a]	139,390	296,270	327,400	13.39	2.53	8.91
Resident days of care	---	256,332,490	368,906,000	---	9.53	---
Beds per nursing home	39.9	55.7	74.8	5.72	7.65	6.49
Residents aged 65+ per 100 U.S. population aged 65+[b]	2.3	3.6	4.6	7.75	6.32	7.18

[a] Estimate was based on data collected during the calendar year preceding surveys.

[b] Bases of rates were derived from estimates of the Bureau of Census [123].

Source: Data adapted from Ingram and Barry [45]; National Center for Health Statistics [130,132].

TABLE I-3

SELECTED DATA FOR THE MEDICARE PROGRAM 1969-73

Items	July of Year				
	1969	1970	1971	1972	1973
Participating SNF Facilities	4,849	4,656	4,287	4,041	3,977
Participating SNF Beds	341,735	333,630	307,548	291,636	287,606
Beds Per 1000 Enrollees	17.3	16.7	15.2	13.9	13.8
SNF Admissions (1000's)	522	477	421	397	405
Average Daily Charges	---	$27	$30	$32	$32
Average Daily Charges, 1977 Dollars[a]	---	$45	$47	$49	$47

[a] Charges adjusted by the Medical Care component of the Consumer Price Index.

Source: Social Security Administration [142].

1969 and 1973. The number of skilled nursing facilities in the Medicare program dropped 18 percent, and at the same time, the number of Medicare certified beds declined by 16 percent. While comparable data are not available for the Medicaid program, the available information indicates that the participation of nursing homes in the Medicaid program has been rising. The 1973-74 National Nursing Home Survey reported that 69 percent of all nursing homes were certified by Medicaid or by both Medicaid and Medicare [130]. Thus, over twice as many facilities participated in the Medicaid program than in the Medicare program in 1973-74. Unfortunately, no systematic tabulation has been made of the changing participation of facilities in the Medicaid program.

The growth in the number of nursing home beds has not been uniform across states. The data are summarized in Table I-4. Growth in the number of beds between 1969 and 1973 varied from a low of 19.4 percent in Utah to 215.6 percent in Alaska. This variation across states persists even when the data are standardized for differences in the elderly population. The highest change in the number of beds per 1000 persons 65 years of age and over was still in Alaska, but the number of beds per 1000 persons 65 years of age and over actually declined in Arizona, one of only two states which did not participate in the Medicaid program between 1969-73. On the average, the growth rates have been lower in the southern states compared to the rates in other regions, but no obvious overall pattern emerges.

Finally, the evidence indicates that the structure, organization, and size of facility have been changing. The number of beds per facility increased from 40 in 1963 to 75 in 1973 (Table I-2). At the same time, the number of facilities per nursing home firm were also increasing. The American Health Care Association reported as early as 1968 that there was an increasing number of multifacility firms [9]. The Morton Research Corporation more than doubled the number of multifacility nursing home firms included in its analysis of the economic and financial status of the nursing home industry in 1977 over 1974 [73, 74]. The growth of these large firms has also been the focus of investigations by the U.S. Senate Subcommittee on Long-Term Care.[4] An increase in the number of beds in,

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[4] See Part V.

TABLE I-4

GROWTH TRENDS IN NURSING HOME BEDS, BY STATE, 1969-73[a]

STATE	BEDS			BEDS PER 1000 ELDERLY [b]		
	1969	1973	PERCENT CHANGE	1969	1973	PERCENT CHANGE
ALABAMA	11,141	14,344	33.2	35.5	41.5	16.9
ALASKA	192	606	215.6	27.5	75.8	175.6
ARIZONA	4,757	6,364	33.8	33.5	32.5	-3.0
ARKANSAS	12,431	17,896	44.0	54.6	69.4	27.1
CALIFORNIA	90,343	149,146	65.1	52.6	77.3	47.0
COLORADO	11,978	16,617	38.7	65.5	83.1	17.6
CONNECTICUT	15,734	23,084	46.7	56.2	75.4	34.2
DELAWARE	1,351	2,213	63.8	30.8	47.1	52.9
FLORIDA	22,187	33,225	49.7	26.2	27.9	6.5
GEORGIA	18,685	25,501	36.3	38.9	63.4	63.0
HAWAII	1,343	2,707	101.6	31.2	53.1	70.2
IDAHO	3,082	4,190	36.0	46.7	56.6	21.2
ILLINOIS	51,671	79,630	54.1	47.5	70.8	49.1
INDIANA	24,418	34,144	39.3	50.6	66.6	31.6
IOWA	26,467	34,677	31.0	75.8	95.7	26.3
KANSAS	16,410	22,765	38.7	62.4	82.1	31.6
KENTUCKY	11,364	18,142	59.6	34.2	51.2	49.7
LOUISIANA	11,734	16,951	44.5	40.0	51.5	28.8
MAINE	5,004	9,144	82.7	43.1	75.6	75.4
MARYLAND	13,773	17,709	28.6	49.0	54.3	10.8
MASSACHUSETTS	36,793	53,706	46.0	59.0	82.4	39.7
MICHIGAN	32,682	48,108	47.2	43.6	61.1	40.1
MINNESOTA	29,036	44,250	52.4	71.5	104.0	45.5
MISSISSIPPI	3,959	7,349	98.3	18.3	32.5	77.6
MISSOURI	25,278	33,631	33.0	45.6	57.7	26.3
MONTANA	2,829	4,699	66.1	41.6	66.2	59.1
NEBRASKA	11,893	17,110	43.9	66.1	90.5	36.9
NEVADA	744	1,425	91.5	26.5	37.5	41.5
NEW HAMPSHIRE	3,367	5,332	50.3	49.0	69.5	41.8
NEW JERSEY	21,785	33,966	55.9	32.4	46.3	42.9
NEW MEXICO	2,134	3,238	52.3	31.7	40.7	28.4
NEW YORK	63,376	91,525	44.4	32.4	46.0	42.0
NORTH CAROLINA	14,941	21,994	47.2	37.3	48.3	29.5
NORTH DAKOTA	4,703	6,631	41.0	71.3	94.7	32.8
OHIO	47,335	64,974	35.3	48.3	62.6	29.6
OKLAHOMA	23,586	29,302	24.2	81.9	91.3	11.5
OREGON	12,986	18,185	40.0	59.8	74.2	24.1
PENNSYLVANIA	48,243	65,897	36.6	38.7	49.8	28.7
RHODE ISLAND	4,594	6,431	40.0	45.5	59.0	29.7
SOUTH CAROLINA	5,231	8,101	54.9	28.4	38.2	34.5
SOUTH DAKOTA	5,380	7,795	44.9	57.2	93.9	39.7
TENNESSEE	10,474	14,718	40.5	28.2	35.5	25.2
TEXAS	52,107	79,998	53.5	54.9	73.8	34.4
UTAH	3,315	4,556	19.4	52.3	53.5	2.4
VERMONT	2,358	3,302	55.5	47.2	73.1	55.5
VIRGINIA	9,406	16,556	76.0	26.7	41.5	55.3
WASHINGTON	17,286	31,065	79.7	55.5	80.3	52.2
WEST VIRGINIA	2,452	4,580	86.3	12.6	22.4	77.3
WISCONSIN	27,139	65,783	142.4	58.6	97.5	66.4
WYOMING	1,041	2,220	113.3	34.7	57.4	65.4
NATIONAL	877,067	1,313,472	49.8	45.2	61.5	36.1

[a] Nursing home beds includes NCHS's definitions of nursing care and personal care with nursing beds.

[b] Persons 65 years of age and over.

Source: National Center for Health Statistics [127] or skilled nursing units attached to hospitals has also been reported by the American Health Care Association [9]. No data on changes in the number of such long-term care beds affiliated with hospitals were available to our knowledge, although various experiments in converting excess hospital beds to skilled nursing care beds have recently been undertaken.[5] In addition to these changes in the industry, there have also been increases both in the number of corporations relative to sole proprietorship and partnerships, and in the number of facilities operated by lessees. As homes have become larger, liability and tax laws have likely combined to influence owners to incorporate. Furthermore, the development of professional administrators has contributed to the frequent separation of management and ownership. Finally, there was apparently some decline in the total number of proprietary facilities between 1971 and 1973. This slightly increased the proportion of nonprofit facilities [5]. The proportion of proprietary facilities was estimated to be about 75 percent in 1973 [133].

C. Expenditure Increases and the Involvement of Government

As government has increased its involvement in the nursing home industry, and as the industry grew in numbers of beds and patients, substantial increases in nursing home expenditures have resulted. The data in Table I-5 show that expenditures on nursing home care exceeded $12.6 billion in Fiscal Year 1977. This amount represented over a threefold increase since 1970, and almost a tenfold increase since the advent of Medicaid and Medicare in 1965. The annual rates of growth in expenditures on nursing home care approximated 25 percent in the five years, 1965-70, and only fell below a 20 percent annual growth rate in recent years.

The shift of expenditures to the public sector from private sources has been even more dramatic than the increase in aggregate expenditures on nursing home care. Public expenditures as a percent of total nursing home care expenditures has steadily increased from 1950 to the present,

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[5] One example is the experiment in the State of Utah, sponsored by the Health Care Financing Administration, which has attempted to use beds in small, rural hospitals in lieu of nursing homes.

TABLE I-5

SOURCE OF FUNDS FOR NURSING HOME EXPENDITURES, 1950-77

Year	Total Expenditures (Millions)	Source of Funds (Millions)		Public as Percent of Total Expenditures	Annual Percentage Change in Expenditures	
		Private	Public		Total	Public
1950[a]	$ 178	$ 167	$ 11	6.2	---	---
1955[a]	291	244	47	16.2	10.3	33.7
1960[a]	480	353	127	26.5	10.5	22.0
1965[a]	1,271	822	449	35.3	21.5	28.7
1970[a]	3,818	2,145	1,673	43.8	24.6	30.1
1975[b]	9,100	4,086	5,014	55.1	19.0	24.6
1976[c]	10,600	4,744	5,856	55.3	16.5	16.8
1977[d]	12,618	5,434	7,184	56.9	19.0	22.7

Sources:

[a] Worthington [153]

[b] Mueller and Gibson [76]

[c] Gibson and Mueller [34]

[d] National Center for Health Statistics [134]

rising from only 6.2 percent to almost 57 percent, or an increase of over seven billion dollars (Table I-5). Annual growth rates exceeded 30 percent between 1965 and 1970, and fell only moderately to slightly below 25 percent in the following five years. The increase in expenditures on nursing home care from public sources rose about 23 percent in 1977 over 1976.

There is no doubt that the single major reason for the increases in nursing home expenditures in recent years was the implementation and expansion of the Medicare and Medicaid programs. The most rapid rates of growth in the public sector have paralleled the expansion of the role of government. This influence of government programs should not have been surprising. A large number of the elderly poor could now afford nursing and long-term care that was not accessible to them in earlier years. The key question is to what extent can the increased expenditures be attributed to increases in the demand for nursing home services (i.e., the utilization of services) versus the increases in the price of nursing home services, which occurred both because of general inflation and because of changes in the relative prices of nursing home and medical services.

Table I-6 summarizes the cost of providing a patient day of services in various years between 1967 and 1977. These costs rose by 140 percent, from $6.34 to $14.22 per day in six years, 1967 to 1973. Slightly less than half of this increase is explained by inflation. The increase in expenditures per patient day in constant dollars was still 74 percent over the six years.

Thus, at least half of the dollar increase in per patient day costs resulted from factors other than inflation. Several factors were likely relevant. First, both state and federal standards of care were rising during these periods. Additional nursing time per employee as well as more time of relatively more highly paid personnel, such as registered nurses, licensed practical nurses, physical therapists, and so forth, were required. Further building safety codes, standards pertaining to modernization of buildings, and increased space per bed affected capital inputs as well. Second, there were changes in patient mix to patients requiring more intensive care. This was especially true with Medicare patients, and as Medicaid standards matched those of Medicare, the proportion of heavy

TABLE I-6

EXPENDITURES PER PATIENT DAY, 1967-77

Year and Percent Change	Total Expenditure (millions)	Average Daily Census	Expenditures Per Patient Day		Expenditures Per Patient Day (1973 Dollars)		Proportion of Change from Inflation
			Amount	Percent Change[a]	Amount	Percent Change[a]	
Year							
1967[b]	$ 1,751	756,239	$ 6.34	--	$ 8.74	--	
1969[b]	3,057	849,016	9.86	56	11.97	37	.34
1971[b]	4,890	1,107,046	12.10	23	12.98	8	.65
1973[b]	6,650	1,196,792	15.22	26	15.22	17	.35
1973-74[c]	6,650	1,075,800	16.94	--	16.94	--	--
1977[c]	12,618	1,287,400	26.85	58	18.27	8	.86
Percent Change							
1969-73	--	--	54	--	27	--	.50
1967-73	--	--	140	--	74	--	.47
1973-77	--	--	58	--	8	--	.86

[a] Percent change over previous year shown.

[b] Expenditure data: Worthington, N.L. [153]; average daily census computed from National Center for Health Statistics [127].

[c] National Center for Health Statistics [134].

care patients may well have increased. Third, there were increased costs directly related to the participation in the Medicaid and Medicare programs. Additional reports and records were required for reimbursement and regulatory purposes. Fourth, there was the possibility that profits were greater in the short run than were necessary to attract additional capital with which to meet the increase in demand for nursing home services, and accordingly added to the cost of care.

The dramatic increases in public expenditures for nursing home services were not anticipated by anyone. Both the rate of increase and the amount of annual payments to the nursing home industry have become matters of substantial concern to taxpayers, public officials, and budget-conscious state and federal agencies. In recent years, cost control and cost containment strategies were devised including controlling entry through certificate of need legislation and other means of regulation. Although the 1972 amendments to the Social Security Act did not specify the exact shape that reimbursement policies must take, the rationale offered in mandating cost-related reimbursement systems was clearly to design a payment system to curtail spiraling public cost while maingaining the quality and desired level of growth of long-term care services.

It is to a brief consideration of the consequences of this shift to complex cost-related reimbursement systems that we now turn.

IV. BASIS AND RATIONALE FOR THE RESEARCH

Whether or not the increased government involvement in the nursing home industry and the new payment for services policies of the last decade were required has not been entirely clear. The nursing home industry has been, and in fact remains, essentially competitive, although public expenditures have grown from 37 to 57 percent of total annual nursing home expenditures between 1965 and 1977. Nursing home owners and investors have substantially expanded the number of beds in all areas of the country and have offered different levels of care, without further concentration of market power. Whether needed or not, however, administratively operated reimbursement systems have replaced the market system for setting the price of nursing home services for a substantial proportion of the residents in long-term care facilities.

State reimbursement policies have been the key to the influence government has had on the industry. The new systems, mandated under the various amendments to the Social Security Act, in principle were to pay for nursing home services on the basis of their cost relatedness, including the costs of capital resources. In some respects these new cost-related schemes followed the public utility regulation model, and have attempted to set the reimbursement rate on the basis of actual costs of the nursing home facility or group of facilities. Whether such a model can be applied effectively and can assure the efficient use of resources in the supplying of nursing home services has been uncertain. A number of problems have been recognized by this approach and some created as a consequence of the shift from the market allocation of resources and price setting for nursing home services to the regulation of the industry by government action.

In the first place, too little attention was paid to the practical difficulties of collecting and monitoring costs of 15,000 or more separate, small, and diverse nursing home firms. Not only is the reporting task in itself monumental, but also the opportunities for manipulation of reports, records, and accounting data were numerous. Accusations and evidence of fraud have been frequent, aside from the observation that costs under such systems would climb rapidly under the most legal of operations. Under the reimbursement of reasonable costs, neither provider nor user had any incentives to restrict utilization of services or to control costs. Furthermore, the substantial variations in accounting systems and record keeping have precluded any effective method or comparisons of costs across facilities, or means to assure equitable payments across nursing homes. No mechanism was in place, nor has yet been established that provides systematic and equitable payment to nursing homes or that controls effectively either the aggregate public expenditures on nursing home services or the efficiency with which resources in the industry were used.

In the second place, the process of administratively determining prices was openly subjected to the political pressures of partisan groups, and accordingly has failed to provide the appropriate signals for the efficient use of resources. Providers clearly will speak loud and clear if their costs are not being met, but no signals can be given directly by the political system when laxity prevails in allowing unnecessary costs, or profits are higher than for other investment opportunities. In fact, both providers and residents, whose care is paid for by a "third party" government agency, will maintain a steady clamor for better and more expensive care. But no concern will be expressed by consumers because services are too commodious or extensive, or by providers if profits are too high or the producer's life is an "easy" one. There are fewer, and certainly less clear signals under a regulatory system for determining when the system is working efficiently than is the case in the market place at large.

Setting aside the above issues, which relate to the administrative, practical, and political aspects of a regulatory system, there are other matters not always immediately evident in the regulatory setting. For example, the cost-based systems purport to measure the costs of capital. This implies an ability to determine real costs from the records of the firm, in the case where no market transactions take place, and no objective external data are available. Furthermore, substantial debate has occurred over the riskiness of investment in the nursing home industry, how to measure it, and how to take its presence into account in estimating the cost of capital. There are also issues related to the efficient use of resources and the level of allowed costs under a reimbursement system. Other questions arise over why the industry structure has been changing and what, if anything, should be done about evolving industry characteristics and models of long-term care service delivery. Finally, knowledge of the effects of reimbursement schemes on the quality of care, the mix of funding sources, bed capacity, certification, and other aspects of the quantity and quality of nursing home care is limited, yet these matters are directly related to regulatory activity.

In addition to the basic issues on what costs are allowable and what are not, there are also a number of administrative decisions regarding details of the new reimbursement schemes, which were avoided under a direct payment-to-vendor system prior to Medicare and Medicaid programs. These decisions relate to various elements or components of reimbursement policies, such as what depreciation method to use, what limits to place on which cost centers, how to handle non-arms-length transactions, what method to use in allowing profits or in setting rates of return on equity capital, and so forth. While it might appear that these elements increase the number of tools that policy makers can use to influence outcomes consistent with policy objectives, in fact there is little knowledge of the effects which changes in the various features might bring about. The regulation of the nursing home industry and the reimbursement of nursing home care have proceeded on the basis of implicit and intuitive predictions of results, which may or may not have occurred. It is essential that policy makers know the consequences of alternative reimbursement systems and the impact of various elements of such systems on the nursing home industry if reimbursement and regulatory objectives are at all likely to be achieved.

It is therefore not surprising, because of this array of problems and issues, that both aggregate and per diem expenditures for nursing home services have reached levels of substantial concern to taxpayers and legislators interested in fiscal conservatism and cost containment. Allegations of fraud and "rip-off" continue to find their way into the public press. Growth has been substantial, and raises serious questions of excessive profits, high costs, and unnecessary price increases. However, it is also unlikely that excess profits, runaway growth, and excessive inflation would persist for long in a competitive industry such as the nursing home industry unless the involvement of government through the reimbursement and regulatory system contrived to create the opportunity for high profits and rapid growth.

In almost every state the current reimbursement plans are under political, if not legal attack by the nursing home industry. Accusations of poor quality care are made repeatedly and almost continuously by consumer groups and in the press; providers reply by insisting that current payments for services are inadequate. Furthermore, the rate of increase in public expenditures continues to climb and increasingly places health care and Medicaid budgets under severe stress. In brief, the question of what is a workable or effective reimbursement system remains unsettled, even after more than ten years of experience under the Medicaid and Medicare programs.

Clearly a critical analysis and empirical examination of the impact of reimbursement systems on the nursing home industry was long overdue. Even after ten years of experience with various reimbursement schemes in the several states, no systematic examination of the experiences of these plans adopted by the state has been undertaken. In part this absence of previous studies of nursing home reimbursement is accounted for by the very complexity of the forces and problems which have come with and have been created by the increased involvement of government in the industry. The reimbursement of capital resources alone is a very complex matter, as is evidenced by the volumes of studies on public utility rate setting and related capital issues. Analyses of the nursing home industry were also particularly complex because of the difficulties of measuring quantity or quality of output. Further data have been collected for various reasons and at various times with little regard to consistency or definitions or to comparability with existing data sets. Changes in government regulations and modifications in state reimbursement systems have exacerbated this problem. Finally, patient and financial records were not readily available, and the latter, when available, suffered from the deficiencies and problems of accounting methods and procedures.

The very complexity of the issues, the absence of extensive uniform data, the dynamics of the industry, and the changing role of government have made a comprehensive study that would provide answers to all the interesting and troublesome questions on the impact of reimbursement systems in the nursing home industry neither advisable or possible. Alternately, it has, therefore, been necessary to do partial analyses and to ask limited questions. Answers to specific individual problems associated with reimbursement systems in the nursing home industry would most likely yield answers from which the consideration of alternatives to the present systems could be undertaken. Thus, this research has focused on four questions regarding profits, rates of return, growth, and the reimbursement systems in the nursing home industry. This approach represented a compromise between an attempt to complete a comprehensive review and analysis of reimbursement systems under substantial handicaps of data unavailability, and a research effort to provide results important to understanding some aspects of the impact of reimbursement systems on the nursing home industry.

V. ORGANIZATION OF THIS REPORT

This report is organized into eight parts. Following this background and overview set forth in Part I, the following four parts deal successively with the four studies described briefly above: Reimbursement Policies and the Growth of the Nursing Home Industry: A National Study (Part II); State Studies of Nursing Home Rates of Return (Part III); Riskiness of Investment and Rates of Return in the Nursing Home Industry: A Risk Study (Part IV); and Vertical and Horizontal Integration and the Profitability of Nursing Homes (Part V). Part VI summarizes the findings of the four studies, offers general conclusions, and discusses the implications of the results for changes in nursing home care reimbursement and public policy towards the long term care industry. The remaining two parts of the report consist of the references used in the study (Part VII) and the appendices (Part VIII). All data sources and data used in the study are contained in the appendices in addition to supplementary tables and results for each of the separate studies discussed in Parts II through V.

PART II

REIMBURSEMENT POLICIES AND THE GROWTH OF THE NURSING HOME INDUSTRY: A NATIONAL STUDY

PART II

REIMBURSEMENT POLICIES AND THE GROWTH OF THE NURSING HOME INDUSTRY: A NATIONAL STUDY

I. INTRODUCTION

Extensive federal and state efforts to evolve better reimbursement systems have occurred in response to the very rapid increase in nursing home expenditures and the multi-billion-dollar annual support for long-term care from public funds. These attempts, however, have failed to settle the issues in nursing home care reimbursement. In almost every state, the current Medicaid reimbursement plans are under political, if not legal attack by the nursing home industry. Accusations of poor-quality care are made repeatedly and almost continuously in the press; the industry reports by insisting that compensation for services profided is inadequate. In brief, the question of what is a reasonable method for reimbursement of the nursing home care remains unanswered, even after 10 years of experience under the Medicaid program.

In recent years the states have been experimenting with variations of reimbursement systems that are based on reported costs of nursing homes. At the beginning of 1978, the states were finally required to meet the HEW criteria of cost-related reimbursement systems in response to the Congressional mandate in the 1972 Social Security Act amdnements. But there remains widespread disagreement among government officials, industry representatives, consumers and others regarding how the different features of the cost-related reimbursement systems affect long-term care, its delivery, and costs. In fact, no systematic examination of the experiences of these systems adopted by the states has been undertaken to determine what some of these effects might be. Yet knowledge of the consequences of alternative reimbursement systems and the impact of various elements of these systems on the nursing home industry and the patients it serves is essential if any progress is to be made in resolving some of the remaining unsettled issues in the reimbursement of nursing home care.

This study was an attempt to supply missing information about the effects of state Medicaid reimbursement policies in nursing homes. The study concentrates on determining what could be learned from a systematic analysis of the past state reimbursement policies and changes in the nursing home industry. The primary questions concerned the relationship between nursing home profits and growth, and reimbursement systems. Nursing homes provide multidimensional goods, and the examination of the effect of reimbursement systems on several aspects of the quantity and quality of nursing home services could well be undertaken. Although the impact of reimbursement policy on several aspects of nursing home care, such as the quality of care, mix of funding sources, size of facilities, and bed capacity certification, were considered in this study, these relationships were secondary to the interest in nursing home profitability which is systematically related to reimbursement policies.

An analysis of the relationship between profits and reimbursement policy could not be undertaken directly. Data on profits were unavailable. Accordingly, this study examined the impact of reimbursement policies on the growth of the industry. The rationale for this examination is that state reimbursement policies affect the profitability of nursing homes, which in turn influences the rate of growth of the nursing home industry. In those states in which the reimbursement systems permit larger profits to be made, the industry will grow more rapidly than in the other states. Certain implications about the growth of the industry across states can therefore be derived by examining the different elements of state reimbursement systems and their expected effects on profits.

Specifically, we examined systematically the reimbursement schemes and growth experience of all states between 1969 and 1973 to determine how different features of the reimbursement systems affected the growth, and by extension the profitability, in the nursing home industry during that period. We attempted to test the hypothesized implications of the state reimbursement policies for changes in bed capacity of nursing homes. Where the implications of the reimbursement policy were not clear-cut, we attempted to establish the direction of influence of the various elements of the reimbursement systems.

For the past decade federal and state governments have been manipulating individual elements of reimbursement policies with a view to achieving a more desirable system. The rationale for these alterations was invariably based on untested assertions of how a particular element of the reimbursement system affects the profitability of nursing home operations. It was the primary purpose of this analysis to determine from observation of state reimbursement systems in practice, the actual influence of individual elements of those systems on growth and, by extension, on the profits of the nursing home industry. It should be emphasized that, although the dependent variable was a growth measure, it was not the intent in this study to account for growth per se. Growth was used as a proxy for profitability. The purpose of this analysis was to establish what effects resulted from attempts to modify profitability by fine-tuning reimbursement systems.

In the next section, we describe and discuss the research strategy for determining the influence of reimbursement policies on profits and the growth of the nursing home industry. The third section briefly describes the data used in this study. The fourth section presents the results. In the final section, we summarize the results, and briefly examine the implications of our findings for reimbursement policy.

II. RESEARCH STRATEGY

Three questions were the key to the research strategy. First, how can the qualitative provisions of state reimbursement systems be converted to a set of variables amenable to empirical examination? Second, how appropriate for the purposes of this study is the period of nursing home growth for which data were available? Third, how can the influence of reimbursement variables best be estimated from the available state data on nursing homes? Each of these questions is discussed in turn below, followed by the specification of equations to be estimated.

A. Description of Reimbursement Systems

The state reimbursement systems were divided into flat-rate systems and cost-related systems. For each type of system we defined a set of variables to capture those features of the system that are commonly manipulated with a view to altering the level of payments made to nursing homes. Examples include the various methods of allowing for depreciation or paying for the use of capital under cost-related systems, or whether separate rates are specified for groups of facilities under flat-rate schemes. The state reimbursement systems have a great number of characteristics; many of them are of secondary importance. Fortunately, for the purposes of this analysis, developing a set of variables to capture all characteristics was not essential. We consider the main provisions of the flat-rate systems and then discuss the elements of cost-related reimbursement systems.

1. Flat-Rate Systems

Under flat-rate systems, a state prospectively specifies a fixed amount per diem that it will pay for the care of Medicaid patients. Flat rates can be established by states based on (1) the historical cost of producing nursing home services, (2) private patient rates in the state, and (3) arbitrary determination by the state legislature or the state Medicaid authority. In a given state, the actual rate determination is also influenced by other factors such as the size of its Medicaid budget, the size of the Medicaid-eligible population seeking long-term care services, and the strength of the nursing home lobby.

The unique characteristic of the flat-rate system is that the reimbursement rate is independent of costs in the individual facility, but is determined for groups of facilities or for levels of care. Separate flat rates are sometimes specified for different groups of nursing homes depending upon the characteristics of the nursing home, such as size, location, and type of ownership, but all facilities, or all facilities within a group, are paid the same rate. More often, separate rates are specified according to the type of care provided. Once the rate is established, the providers are free, within licensure standards imposed by the state, to make decisions regarding input allocation and quality of service.

We have defined four variables to capture the primary variations across states with flat-rate systems:

- Negotiated Rates. This variable identified states where the flat rate was based on direct negotiations between the state and operators of nursing homes, or their representatives.
- Group Rates. This variable identified states where different flat rates were established for different classes of facilities based on characteristics such as size, location, and type of ownership. All facilities within a class received the same rate.
- Patient Care-Specific Rates. This variable was defined to distinguish among states that specify different flat rates for different levels of care. The rates for groups of patients receiving the same level of care were the same across all facilities.
- Flat-Rate Amount. This variable was defined as the rate paid to nursing homes by the state in 1970 for skilled nursing care. If different groups of nursing homes received different rates, then the variable was defined to take on the value of the highest rate paid for skilled nursing care.

2. Cost-Related Systems

Cost-related systems have several distinctive features. The reimbursement rate under these systems is based on the actual cost of providing the service by each facility. Since several types of resources are required to generate a unit of nursing home service, cost-based systems specify, with varying detail, allowable costs and ceilings on individual cost items. Stringency or laxity in such systems depends upon the items for which reimbursement is allowed, and any dollar limits placed on specific items. In essence, the system works in two steps: (1) facility cost reports are examined to determine the portion of costs incurred by a facility for each input item which is allowed under the reimbursement system; (2) total allowable costs are then divided by the total number of patient days to determine a per diem rate for the facility. In addition, an explicit provision for profits is usually included.

Variation in the cost-related systems results from differences in what costs are allowed, how allowable cost amounts are determined, what maximums are specified on allowed costs, what procedure is adopted to determine allowable profits, and what special provisions are made to contain costs and discourage fraud. These variations of cost-related systems can be grouped under three broadly defined categories: (a) how rates are determined; (b) the treatment of capital costs; and (c) containment of costs and fraud. These categories assist in specifying the variables used to define the cost-based systems.

How Rates are Determined. A variable was defined to classify states with cost-related systems into those which determined their rates prospectively and those which determined their rates retrospectively. Prospective rates are determined before the accounting period. They are based on the facility costs of the previous period and generally include an adjustment for inflation. Retrospective rates, on the other hand, are based on costs actually incurred in providing the nursing services. Initially, the facilities are paid an interim rate based on the previous year's costs; at the end of the accounting period the rates are adjusted retroactively so that the payments will equal the actual allowed expenditures incurred by the facility.

Treatment of Capital Costs. Provisions for capital payments included how the depreciation of facility and equipment was reimbursed and what specific payments for profits were made, if any. Each of these is discussed in turn.

Depreciation of capital is a valid operating expense and was allowed by all states with cost-related systems. The rate of actual depreciation, however, was not observed. States generally allowed the use of IRS life tables for determining the annual rates of depreciation.

The amount of depreciation reimbursed also depends upon the depreciation methods that are permitted by states: specifically, (1) whether accelerated depreciation or only straight-line depreciation is allowed, and (2) whether the depreciation base is the original cost or the purchase price of the asset. No state allowed the use of replacement value as a depreciation base.

The states have used three different ways to specify explicit payments for profits in a reimbursement system: (1) a specified rate of return on equity capital; (2) a fixed dollar amount per patient day; and (3) a fixed percentage of reimbursed costs.

In the following analysis we used two variables based on depreciation provisions: the first variable groups states by the depreciation method permitted; the other groups states by the base value used for purposes of depreciation. Two variables were also used to place the states into three separate categories based on the method for payment of profit.

Containment of Cost and Fraud. Reimbursement systems include several sets of provisions to control costs and reduce fraud. The first set of provisions relates to allowable costs and payment limits. States specify the different types of costs in providing nursing home services that will be allowed under the system. Disallowed costs are usually expenditures for activities that do not directly contribute to patient care. Furthermore, there are limits that are placed on allowable costs. These limits might be placed on specified items and/or on the total reimbursement rate. Five variables were defined to encompass these variations--one for a maximum on the total payment and four others for maximums on debt interest payments and other specific operating costs, such as food, housekeeping, etc.

Three other variables pertaining to cost containment and fraud were identified and apply to the occupancy rate, review and auditing, and transactions between related organizations. Some states, for example, make reimbursement dependent upon minimum occupancy rates rather than by determining the per diem rates by dividing the total allowable costs by actual patient days. This rate is determined by dividing the costs by the larger of (a) actual patient days, or (b) patient days for a specified minimum occupancy level. Further, by instituting procedures to review and/or audit the cost reports submitted by nursing homes, states respond to the possibility of manipulating costs on the part of the facilities. Finally, provisions that disallow payments for transactions between related parties are becoming more common. These transactions include rental agreements between affiliated organizations, interfacility transactions within the firm, and so forth.

B. The Appropriate Growth Period for Analysis

The period 1969 to 1973 was selected for purposes of this analysis for several reasons. First, the best data were available for this period. Information on the growth of the industry as well as related variables of interest was more complete than for other possible periods. Data sources and availability of data are described and discussed in detail in Appendix A. Two other criteria were also relevant for choosing the appropriate period for study and analysis. These criteria were: (1) whether during the selected period the reimbursement systems were reasonably well established across states and whether they generally remained unchanged; and (2) whether during that period the state reimbursement systems could have been expected to affect the growth in the nursing industry. It was possible to define and apply these two criteria only in broad terms because of the nature of developments in the nursing home industry since 1965.

The description of the growth of the nursing home industry and the changing role of government were discussed in Part I. Two general conclusions from that discussion are applicable here. First, the enactment of Medicare and Medicaid programs released a pent-up demand for nursing home services. Second, however, these programs provided substantial incentive for the development of formal reimbursement systems in the states which, apart from covering the costs of patients' care, included provisions for an adequate return on investment. From 1965 - 1969, the supply of beds increased at an annual rate of 17 percent; thereafter the growth of nursing homes continued but at a reduced annual rate of only 9 percent [9, p.5; 45, p.304]. Supply was catching up with the new demand created by the 1965 legislation [146]. Furthermore, most states had an opportunity to put reimbursement systems in place by 1969-70, and no further major changes were introduced until 1973-74 and later.[1]

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[1] Although some states did change reimbursement plans between 1969 and 1973, the actual reimbursement variables used in the analysis were descriptors of the reimbursement system which prevailed for the longest time between 1969-73 in each state. Furthermore, the fact that states did not adopt reimbursement systems at the same time is relatively unimportant. It is not possible to predict the lag between the formal implementation of a reimbursement policy and the market response. One would expect that information on potential state reimbursement policies would be available to the market well before their formal adoption. This informal flow of information makes using 1969 as the starting period for our analysis reasonable, even though some reimbursement systems were only becoming effective around that period.

The best period, therefore, to look at the relationship between the growth in the industry and reimbursement policies was between 1969 and 1973. By 1969, the supply of beds had to a large extent caught up with increased demand for nursing home beds created by the enactment of Medicaid and Medicare programs. Most states had reimbursement plans in place. The subsequent growth of the nursing home industry had a reasonable opportunity to have been affected by the various elements of the reimbursement policies described above.

C. Methods of Analysis

The best method of estimating the influence of reimbursement variables on nursing homes depends on the reasonableness of the rationale underlying the estimation process, analytic procedures and the form of the estimating equations, and the determination of the exact variables to be used in the equations. Each of these issues is considered below.

1. Rationale

The primary question in this part of the project concerned the relationship between reimbursement policies and profits, and more broadly, the impact of reimbursement policies on the quantity and quality of nursing home services. An examination of the direct relationship between profits and reimbursement policy, however, was precluded by the simple fact that profits data on nursing homes have become available in most states, only in the last two or three years. Typically, only cost reports were obtained by most Medicaid agencies, not detailed income and expense statements or balance sheet data. Even for some states for which profits data were available, the collection and editing of the data were costly and time consuming tasks, as is apparent in the analysis of such data from the four states in Part III of this report.

The relationship between profits and reimbursement was, therefore, approached indirectly. Profits are both income for capitalists, and also the incentive for owners to transfer capital resources from one use to another. If profits are higher in the nursing home industry than in comparable alternatives, capital will be invested in nursing homes, and the industry expands. Conversely, if profits are lower in nursing homes than elsewhere, nursing home owners and entrepreneurs will forego expansion of their enterprises and will attempt to withdraw capital resources from the industry. Thus the growth rate of an industry is one indicator of relative profit levels.

Data on the growth of the nursing home industry across states were available as discussed in Part I and Appendix A. Accordingly, growth of the industry in each state was used in place of level of profits. The examination of the impact of various elements in reimbursement policies on growth was undertaken as the most effective approach to understanding the influence of state Medicaid reimbursement policies on profits and rates of return to capital resources.

2. Analysis Procedures and the Specification of Equations

Multiple regression analysis across states, using a two-step process, was followed. Growth in the nursing home industry was the dependent variable. Reimbursement policies were described by a series of dummy variables (Table II-1), which, along with certain "control" variables, constituted the right-hand-side variables. The signs of the coefficients of the reimbursement policy variables were the objects of interest, since these show the effect of the policy features on growth and, by extension, on profitability in the industry.

The two-step analysis procedure was adopted in order to arrive at unbiased estimates of the effects of reimbursement system features on industry growth. First, we used multiple regression to determine how much of the variation in growth across states could be explained by a set of control variables (discussed below) and an intercept dummy which divided the observations into "flat-rate" and "cost-related" reimbursement systems. In the second step the remaining variation (i.e., variation in the residuals) was analyzed separately for flat-rate and cost-related states, again using multiple regression. In the second step regressions the explanatory variables were dummy variables describing types of flat-rate and cost-related systems. This strategy was followed to account for the distinct nature of the two reimbursement systems, and at the same time, to ask the relevant questions regarding the influence of the various elements of each type of reimbursement system on growth and profitability of nursing homes.

TABLE II-1

THE VARIABLES USED TO DESCRIBE STATE REIMBURSEMENT SYSTEMS
1969 - 1973

Variable Description	Abbreviated Variable Name
Type of Reimbursement System Flat rate = 1 Cost-related = 0	TRF
Flat Rate Systems	
Negotiated Rates Rates specified after negotiation = 1 Rates specified without negotiation = 0	NEG
Care Specific Rates Separate rates specified for different levels of care = 1 Separate rates not specified for different levels of care = 0	CSR
Group Rates Separate rates specified for different groups of nursing homes = 1 Separate rates not specified for different groups of nursing homes = 0	GRT
Cost-Related Systems	
Rate Determination Method Prospective = 1 Retrospective = 0	PRO
Profit - Return on Equity Profit paid as return on equity = 1 Profit paid as percent of costs = 0	ROE
Profit - Fixed Amount Profit paid as fixed amount per diem rate = 1 Profit paid as percent of costs = 0	FPR
Depreciation Method Accelerated depreciation allowed = 1 Accelerated depreciation not allowed = 0	ACCEL
Depreciation Base Original cost base allowed = 1 Purchase price base allowed = 0	DBO
Total Payment Rate Maximum Total payment rate maximum specified = 1 Total payment rate maximum not specified = 0	TL
Administrative Salary Maximum Administrative salary maximum specified = 1 Administrative salary maximum not specified = 0	ASM
Property Related Cost Maximum Property related cost maximum specified = 1 Property related cost maximum not specified = 0	PRM
Operating Cost Center Maximum Operating cost center maximum specified = 1 Operating cost center maximum not specified = 0	OCM
Debt Interest Payment Maximum Debt interest payment maximum specified = 1 Debt interest payment maximum not specified = 0	DIM
Cost Reports Audited or Reviewed Cost reports audited or reviewed = 1 Cost reports not audited or reviewed = 0	AUDIT
Minimum Occupancy Rate Minimum occupancy rate specified = 1 Minimum occupancy rate not specified = 0	ORR
Arms Length Transactions Arms length transactions provision specified = 1 Arms length transactions provision not specified = 0	ALT

Regression equations of the following form for changes in bed capacity, as the measure of growth, were estimated:

II-(1) $\quad CHBD_j = \alpha_0 + \alpha_1 TRS_j + \sum_i \beta_i CV_{ij} + \varepsilon_j \qquad j = 1,\dots,48.$

II-(2) $\quad CHBD_k - \hat{CHBD}_k = \gamma_0 + \sum_i \gamma_i CRV_{ik} + \eta_k \qquad k = 1,\dots,32.$

II-(3) $\quad CHBD_m - \hat{CHBD}_m = \delta_0 + \sum_i \delta_i FRV_{im} + \mu_m \qquad m = 1,\dots,16.$

where

CHBD = Change in the number of nursing home beds per 1000 elderly between 1969 and 1973;

$\hat{CHBD}$ = Predicted value of CHBD;

TRS = Type of reimbursement system (flat-rate or cost-related);

FRV = Variables defined to capture the variation across flat-rate systems;

CRV = Variables defined to capture the variation across cost-related systems;

CV = A set of control variables;

ε, η, μ = A set of random error terms;

$\alpha, \beta, \gamma, \delta$ = Parameters to be estimated.

The critical estimates were those of the alphas, gammas, and deltas for the analysis of the effects of reimbursement policy. The estimated coefficients were used to assess the effect of different elements of reimbursement policies on growth rates.

The unit of observation was the state, which gave a total of only 48 observations.[2] The exact functional form was determined as part of the empirical work; simple forms, such as linear or log-linear, were examined. The final results reported are based on the functional forms that performed the best, i.e., they explained the most variance in the dependent variable and generally exhibited robust coefficient estimates.

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[2] Arizona and Alaska did not participate in the Medicaid program during the period studied.

We also estimated equations using 1973 cross section data. Equations estimated were of the same form as equations II-(1), II-(2), and II-(3), but with the number of beds per capita elderly as the dependent variable rather than the change in the number of beds. The additional cross section equations were estimated in order to determine whether the four years of differences in the state reimbursement systems had systematically affected the resultant bed capacity per capita elderly population across states.

3. Variables

The variables were categorized as dependent variables, reimbursement variables, and control variables. The following discussion describes these and indicates those variables actually used in the estimating equations.

Dependent Variables. The primary measure of growth was bed capacity. For those equations explaining changes in bed capacity, the dependent variable was defined as the change in total number of nursing care beds per 1000 elderly population from 1969 to 1973 in each state. For the cross section equations, the dependent variable was defined as the total number of nursing care beds per 1000 elderly population in 1973 in each state. Based on the classification of facilities used by the National Center for Health Statistics for their Master Facilities Inventory Survey (MFI), nursing care beds were defined to include (a) nursing beds, and (b) personal care beds with nursing.[3]

Reimbursement Variables. Reimbursement variables were identified and summarized in Table II-1. The type of reimbursement system variable (flat-rate versus cost-related) was used on the right-hand-side of equation II-(1). Three of the variables defined under flat-rate systems were used in equation II-(3). "Negotiated rates" proved to be a useless variable. Further, only seven of the thirteen variables defined under cost-related systems were eventually used in equation II-(2). Four variables which defined individual cost item maximums were excluded and only the variable on the total payment limit was retained. Without a total payment limit, the policy provisions specifying maximums on individual items were ineffective. Any influence of these individual item maximims could be evaded by the substitution of resource inputs and/or accounting manipulations. These actions are not effective, however, for evading a limit on per diem payments, i.e., the total payment limit.

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[3] In addition to the bed capacity by type of care equations, several sets of additional regressions were estimated using bed capacity by certification status (e.g., Medicare/Medicaid), proxies for quality of care, variables measuring the mix of funding sources, and several variables on size of facilities. Exace definitions of variables are found in Appendix A and regression results are presented in Appendix E.

Two other reimbursement variables were also subsequently excluded. The arms-length regulation variable was taken out of the equation because the provision was introduced late in the period under examination and by only a few states. Its impact on the variables of interest during 1969 and 1973 was insignificant. Finally, we excluded the depreciation base variable because there was insufficient variation in that variable across states. Only 2 out of 32 states with cost-related systems did not allow purchase price to be used for determining the allowed depreciation cost.

Control Variables. The primary interest in this study was an examination of the influence of reimbursement systems on industry growth in the absence of profit data. Growth was, however, also influenced by a large number of other factors. For empirical work, the list of such factors must be reduced sufficiently to be estimable with the available data. As with all empirical work, we concentrated on controlling for only the important determinants. The purpose of the study was to estimate the coefficients of the reimbursement policy variables. We were confident that our coefficient estimates would not be biased as long as the factors excluded were not correlated with reimbursement variables.

In the first place, we normalized the change in number of beds by population over 65 in each state, to account for obvious size and demographic differences across states. Next seven factors that might influence growth across states were identified: income, ethnic mix, occupancy rates, number of elderly mental institution residents, availability of non-nursing care beds, state regulatory requirements, and health of the population. The choice of these factors was based on a review of related studies regarding demand and supply of nursing services.[4] These seven factors and the nine associated control variables are listed in Table II-2. We discuss each below.

The effect of differences in income (EINC) across states on growth in the nursing care industry is ambiguous. In the first place, the amount of Medicaid subsidy received by a state is (roughly speaking) inversely related to income levels in that state, which introduces a factor that may offset a positive income elasticity. Indeed, since the cross section income distribution has not changed as dramatically as have Medicaid payments in recent years, we would expect the Medicaid effect to dominate in the data leading to an apparent negative income elasticity.

Utilization of nursing home services is known to vary across racial and ethnic groups. A differential responsiveness of these groups to change in economic constraints could be expected and hence a correlation of growth with racial or ethnic characteristics obtained. We therefore used the percentage of the population that is nonwhite (PCTNW) as one control variable. Data on this variable come from census materials and were available only for 1970.

Differences in capacity utilization at the start of the period were entered through the 1969 occupancy rate (ORT). The extent to which growth in demand was reflected in growth in capacity depends upon the available stock of unused or under-used capacity. Capacity growth should occur more quickly where the supply of nursing care beds was tight, less quickly if there were substantial excess capacity.

The ratio of elderly residents in mental institutions to total elderly (MRT) was also selected as a control variable. Transferring patients from state mental institutions into federally subsidized nursing homes was one way for states to take advantage of Medicaid matching funds. We expected to find higher growth rates in states with significant numbers of mental institution residents at the beginning of the period.

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[4] See [19], [43], [55], [56], [83], [88], [96], [103].

TABLE II-2

VARIABLES USED TO CONTROL FOR OTHER FACTORS INFLUENCING THE CHANGE IN BED CAPACITY IN THE NURSING HOME INDUSTRY, 1969-1973

Factors Identified as Important	Variables Defined
1. Income	• Average income of the elderly in the state in 1970 (EINC)
2. Ethnic population mix	• Percentage of elderly nonwhites in the state in 1970 (PCTNW)
3. Occupancy rates	• Occupancy rate in 1969 (ORT)[a]
4. Resident population in mental institutions	• Elderly residents in mental institutions to total elderly in 1969(MRT)[a]
5. Availability of low cost supply of nursing beds	• Number of personal care beds without nursing per 1000 elderly in 1969 (PCB) • Change in number of personal care without nursing beds from 1969 to 1973 (CHPCB)
6. State regulatory requirements	• Certificate of Need (CON) • Minimum staffing required (MSR)
7. Health-related variables	• Life Expectancy rates in 1970 (LEX)

[a] In the cross section analysis discussed above, the occupancy rate was defined as the average of 1969, 1971 and 1973 occupancy rates. The mental resident population (MRT) was defined for 1973 rather than 1969.

We included the number of personal care without nursing beds, both at its 1969 level (PCB) and as the change from 1969 to 1973 (CHPCB), as explanatory variables to account for the ability of the nursing home industry to expand its skilled bed stock from the stock of close substitutes. If there were large numbers of non-nursing care beds which could be quickly adapted to nursing care use, growth should be relatively more rapid than the case where no such beds exist.

Also on the supply side, growth can be promoted or restricted by state intervention. Certificate of need laws (CON) restrict entry into the industry and reduce growth rates. Minimum staffing requirements (MSR) increase costs and reduce profitability, hence growth. Both of these factors were included in the regression specification.

Finally, the differential health status of the population, as a measure of potential "pooled-up" demand, should be measured and included in the regression equations. Unfortunately, the appropriate health status variable was not at all clear for the case of long-term care. We finally used 1970 life expectancy rates (LEX) in states, for lack of a better alternative, to control for variation in health status, though it was not clear what sign we should expect for this coefficient.

As was the case among reimbursement variables, not all of the control variables were eventually included in the regression equations reported here. Those control variables were excluded from the final equations whose coefficients were determined to be insignificant, and whose inclusion or exclusion did not affect the magnitude or significance of the other included variables.[5] The variables dropped from the estimation equations were certificate of need, minimum staffing requirements, and the life expectancy rates.

III. DATA SOURCES

The data for this analysis were obtained from several sources. These are briefly described below for dependent variables, reimbursement variables and control variables, and are considered in detail in Appendix A.

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[5] Such a procedure is commonly used to identify superfluous variables when there is a possibility of an association between dependent and independent variables but no strong theoretical basis for it. Under this process of excluding variables, the coefficients of remaining variables are not biased. See [92, pp. 35-38].

The nursing care bed data for the dependent variables were obtained from the 1969 and 1973 Master Facilities Inventory, which is a biennial census survey of inpatient health care facilities in the United States. The nursing homes in this survey were classified into four classes of nursing homes by type of care--nursing care homes, personal care homes with nursing, personal care homes, and domiciliary homes. We defined nursing care beds as beds in nursing care homes or personal care homes with nursing.[6] The major difference between nursing care beds and other beds is that nursing care beds were in facilities which employ registered nurses or licensed practical nurses for their patients. Beds in nursing homes classified as personal care homes were defined as personal care beds without nursing and were used to define two of the control variables.

The data on reimbursement variables were assembled, principally from the data collected by the General Accounting Office [114], the Urban Institute [145, 146], and Applied Management Sciences [10]. These sources were supplemented by the Commerce Clearing House summary of state plans [25], various state documents, and personal phone conversations with staff members of the state Medicaid agencies. The description of the state reimbursement policies was developed to reflect the reimbursement system that was in effect in each state for the longest period between 1969 and 1973. We relied heavily on the Urban Institute and the Social and Rehabilitation Service, now a part of the Health Care Financing Administration, data [136] for the chronology of reimbursement policy changes. The description of state reimbursement systems thus assembled is summarized in Table II.3.[7]

The data on the control variables were also obtained from several sources. These have been summarized in Table II-4. The means and standard deviations of the control variables are shown in Table II-5. Other data on other control variables considered are in Appendix A.

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[6] It should be noted that our definition of nursing care beds is not the same as that used by the National Center for Health Statistics. The Center defined nursing beds to include beds from only those nursing homes which were classified as nursing care homes. For further details on the MFI survey, see [133].

[7] For a detailed discussion of the exact procedures used to assemble the description for reimbursement policies, see Appendix A.

IV. RESULTS

We estimated three equations, II-(1), II-(2), and II-(3), for the analysis of changes in bed capacity. The first equation examined whether there was any systematic difference in the change in bed capacity between states with flat-rate systems and states with cost-related systems. The second and third equations examined the effects of the different elements of the cost-related systems and flat-rate systems, respectively, on the variation in changes in bed capacity not explained by the first equation. Three similar equations were also estimated using cross section data on 1973 bed capacity as the dependent variable (see Table II-2). The results of each of the three equations for both change and cross section analysis are discussed below in relation to the predicted or expected influence of the independent variables on the nursing home industry.

A. Flat-Rate versus Cost-Related Systems

We discuss the expected effects of flat-rate versus cost-related reimbursement systems on the profits and growth of nursing homes before presenting the empirical results of estimating equation II-(1).

1. Expected Effects

There are several factors that influence the effect of the two types of systems on profit and growth. It is not possible to say *a priori* whether nursing home operations are likely to be more or less profitable in states with flat-rate systems than in states with cost-related systems. The important factors affecting the influence of each of the two systems are described as follows.

The profits received under the flat-rate systems depend upon the level of the flat rate, and on whether different flat rates are specified for different classes of nursing homes and/or for different levels of patient care. Since the costs of individual resource inputs for providing the service do not affect the flat-rate payments received by the nursing homes, facility owners have an incentive to minimize their costs and choose an optimal mix of inputs to provide any level of service. However, when a fixed *per diem* rate is assured, and when

TABLE II-3

A DESCRIPTION OF STATE REIMBURSEMENT SYSTEMS, 1969-73

STATE	REIMBURSEMENT SYSTEM																
	FLAT RATE				REASONABLE COST-RELATED RATE												
		NEGOTIATED RATES	GROUP RATES	PATIENT CARE SPECIFIC RATES		PROSPECTIVE	RETURN ON EQUITY	ACCELERATED DEPRECIATION ALLOWED	ORIGINAL COST DEPRECIATION BASE	TOTAL PAYMENT LIMIT	PROPERTY RELATED COST LIMIT	OPERATING COST LIMIT	ADMINISTRATIVE SALARY LIMITS	INTEREST LIMITS	REVIEW AND AUDIT	OCCUPANCY RATE REGULATION	ARMS LENGTH REGULATION
ALABAMA					X	X	X	X					X		X	X	X
ALASKA																	
ARIZONA																	
ARKANSAS	X	X															
CALIFORNIA	X		X														
COLORADO					X	X				X			X		X		X
CONNECTICUT	X		X														
DELAWARE					X		X	X		X							X
FLORIDA	X																
GEORGIA					X		X				X				X	X	X
HAWAII					X		X	X							X		
IDAHO					X										X	X	
ILLINOIS	X			X													
INDIANA					X	X							X			X	
IOWA					X								X				X
KANSAS					X					X					X		
KENTUCKY					X		X	X									
LOUISIANA	X	X															
MAINE					X		X						X		X	X	X
MARYLAND					X		X	X		X					X		
MASSACHUSETTS					X		X			X			X	X	X	X	X
MICHIGAN	X	X															
MINNESOTA					X	X	X							X	X	X	
MISSISSIPPI					X		X	X		X					X		
MISSOURI	X	X															
MONTANA					X			X					X			X	X
NEBRASKA	X	X															
NEVADA					X						X	X	X		X		
NEW HAMPSHIRE					X		X										
NEW JERSEY					X	X	X			X			X		X	X	X
NEW MEXICO					X		X	X		X			X		X		
NEW YORK					X	X	X			X		X	X	X	X	X	X
NORTH CAROLINA					X		X	X		X			X		X		
NORTH DAKOTA					X		X			X					X		
OHIO	X																
OKLAHOMA	X	X															
OREGON					X	X	X	X		X	X		X		X	X	
PENNSYLVANIA	X																
RHODE ISLAND					X					X			X		X	X	
SOUTH CAROLINA					X	X		X		X			X		X		
SOUTH DAKOTA					X		X			X					X	X	X
TENNESSEE					X		X	X		X					X		
TEXAS	X		X														
UTAH	X	X															
VERMONT					X		X	X					X		X	X	X
VIRGINIA					X		X	X	X	X					X		
WASHINGTON	X			X													
WEST VIRGINIA					X		X						X		X	X	X
WISCONSIN					X		X		X		X	X					
WYOMING	X	X															
TOTALS	16	3	3	2	32	3	23	14	2	17	4	3	17	3	25	15	13

TABLE II-4

LIST OF CONTROL VARIABLES CONSIDERED FOR GROWTH EQUATIONS AND THEIR DATA SOURCES

Control Variable	Data Source and Reference
Average income of the elderly in the state in 1970	
(a) Total elderly income	Bureau of the Census [122]
(b) Elderly population	Bureau of the Census [123]
Percentage of elderly nonwhites in the state in 1970	
(a) Elderly white population	Bureau of the Census [124]
(b) Elderly population	Bureau of the Census [123]
Occupancy rate in 1969, 1973	
(a) Total nursing care and personal care residents	National Center for Health Statistics (annual) [127]
(b) Total nursing care and personal care beds	National Center for Health Statistics (annual) [127]
State population of residents in mental institutions in 1969, 1973	
(a) Elderly mental hospital residents	National Institute of Mental Health [135]
(b) Elderly population	Bureau of the Census [123]
Number of personal care beds without nursing per 1000 elderly in 1969-73	
(a) Personal care beds without nursing	National Center for Health Statistics [129]
(b) Elderly population	Bureau of the Census [123]
Certificate of Need	Havighurst [39]
Minimum staffing required (beyond Medicare regulations)	National Geriatrics Society [78]
Life Expectancy rates in 1970	National Center for Health Statistics [128]

TABLE II-5

MEANS AND STANDARD DEVIATIONS OF NONCATEGORICAL CONTROL VARIABLES

Control Variable	1969 Base Year		Change 1969-73		Cross Section 1973	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Average income of the elderly in the state in 1970	2811.36	501.73	-	-	2811.36	501.73
Percentage of elderly nonwhites in the state in 1970	.101	.127	-	-	.101	.127
Occupancy rate in 1969 and 1973	.899	.045	.010	.034	.909	.035
State population of residents in mental institutions per 1000 elderly population in 1969 and 1973	4.756	3.076	-1.948	1.294	2.808	2.346
Number of personal care beds without nursing per 1000 elderly in 1969 and 1973	3.34	2.87	-2.93	2.87	.409	.391
Life expectancy rates in 1970	70.92	1.34	-	-	70.92	1.34

it is costly for the state to monitor the quality of services provided, there is also an incentive to cut services in order to lower costs. The profits made from the greater scope offered by flat-rate systems for input substitution and service reduction would thus depend critically upon the level of the flat rate. A flat rate lower than the long-run marginal cost of the industry would both lower quality and discourage growth, while a higher rate would promote growth. Finally, the frequency at which the flat rates are revised could also be important to the continuing profitability of nursing home operations. Unanticipated market changes such as inflation, for example, could cause the provider to incur significant losses, if the flat rates were revised only infrequently.

Profitability under the cost-based system depends upon which costs are allowed, how allowable cost amounts are determined, what maximums are specified on allowed costs, and what procedure is adopted to determine the allowed profits. Profits under these systems are also affected by the specific provisions included to contain costs and discourage manipulation of reported costs. The cost-related system creates incentives for fraudulent cost reporting to increase profits because actual costs and a reasonable rate of return cannot be precisely determined for each facility. Such systems provide little incentive for cost containment or efficiency, since all costs on allowed items are generally reimbursed. Under such cost reimbursement policies there is a further incentive to enter into market transactions with kickback arrangements.[8] Such arrangements can be very lucrative. Cost-related systems also induce nursing homes to seek higher profits through excessive use of allowable items for which payment limits are not specified. The final outcome of such reimbursement plans is that the low-cost, efficient nursing homes receive lower payments for the same quality of service than high-cost, inefficient nursing homes.

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[8] A discussion of these practices can be found in the Report of the Senate Special Committee on Aging [119, pp. 284-296].

In summary, the incentive structures of the two systems are such that it is not possible to specify a priori the relative impact of the two systems on profits or growth in the nursing home industry. In practice, the influence of the two systems on bed capacity could be evaluated to confirm whether, on the average, states with one system grew at a faster rate than states with the other system. We estimate equation II-(1) for precisely that purpose.

2. Empirical Results

The results from estimating equations for 1969-73 changes in bed capacity and for 1973 bed capacity using a single variable to describe the type of reimbursement system are shown in Table II-6. The insignificant coefficient estimates of the type-of-system variable (TRF) indicate that there was no systematic difference either in changes in bed capacity over 1969-73 or in the 1973 bed capacity between states with flat-rate systems or states with cost-related systems. The evidence was consistent with the large dispersions of changes in bed capacity across flat-rate states and across cost-related states. For instance, the extent of changes in bed capacity per 1000 elderly varied from 1.1 to 34.7 among flat-rate states and from 5.3 to 46.3 among cost-related states. The type-of-system variables and other factors that affect growth of bed capacity did account for about 40 percent of the variation in growth across states. There remained, however, a significant amount of unexplained variation in the changes in bed capacity among states under each of the two systems.

The control variables were closely associated with the explanation of over 40 percent of the variation in the dependent variables of both the change and cross section equations. The occupancy rate (ORT), percentage of nonwhite (PCTNW), and number of personal care beds available (PCB) were the most significant in explaining the variation in the changes in bed capacity across states. Among them, occupancy rate was the single most important variable in explaining the changes in bed capacity. This variable was not only highly significant statistically, but also showed the largest impact on the change in

TABLE II-6

RESULTS OF REGRESSION EQUATIONS FOR 1969-73 CHANGES IN BED CAPACITY AND FOR 1973 BED CAPACITY FOR TYPE OF REIMBURSEMENT SYSTEM

Variable	Change in Bed Capacity, 1969-73		Bed Capacity, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	3.264	.330	4.094	.355
Independent	Coefficient	Standard Error	Coefficient	Standard Error
Constant	6.100**	2.184	-1.052	1.455
PCTNW	-.090**	.038	-1.015**	.354
EINC	-.384	.284	.099	.098
MRT	.064	.057	- .059**	.020
ORT	2.762**	1.155	5.674**	1.588
TRF	.048	.093	.010	.099
PCB	.281**	.109	---	---
CHPCB	.043	.032	---	---
R^2	.427		.402	
RSS	2.929		3.540	
DF	40		42	
The dependent variable was defined as the natural log of the change in the number of nursing care beds per 1000 elderly population from 1969 to 1973 plus 10. All independent variables were in natural logs with the exception of CHPCB and TRF.			The dependent variable was defined as the natural log of the number of nursing care plus personal care with nursing beds per 1000 elderly in 1973. EINC in thousands.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

bed capacity. A one percentage point higher occupancy rate in a state resulted, on the average, in an additional increase of about three beds per 1000 elderly over the four-year period. The coefficient of the occupancy rate variable was also strongly positive even in the cross section equation. Such a result showed both a larger availability of beds per capita elderly in states with higher occupancy rates than in states with lower occupancy rates and also provided an operational indicator of nursing home growth useful for planning and/or regulating the expansion of the industry.

In contrast to the positive occupancy rate coefficient, the coefficient of PCTNW was negative. States with a percentage point lower nonwhite population (PCTNW) experienced an additional growth in bed capacity of one bed per 1000 elderly. The lower growth among states with higher nonwhite populations might be a reflection of a lower price and income elasticity in terms of the demand for nursing services among the nonwhite population.[9] The cross section results also show a lower utilization of nursing services among nonwhites. States with a higher proportion of nonwhites had a lower number of beds per 1000 elderly in the state.[10]

The third significant coefficient among the control variables was the number of personal care beds without nursing (PCB). States with more personal care beds without nursing in 1969 exhibited a faster growth of beds with nursing care than in the states with few personal care beds without nursing. This result was consistent with the hypothesis that beds with nursing care were more profitable than beds without nursing care. For the early part of the analysis period, Medicaid paid for the care with nursing services but not for care at lower levels. On average, the number of personal care beds without nursing declined from 3.3 per 1000 elderly in 1969 to .04 per 1000 elderly in 1973 (Appendix A).

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[9] In 1973, nearly six percent of nursing home residents were nonwhite [133] while the 1970 census of the population reported the percent of nonwhites in the elderly population was 9.3 [126].

[10] It was recognized that nonwhites, on the average, are poor and therefore, increase the Medicaid-eligible population in the state. This fact is potentially an important determinant of growth, but its influence was controlled by an elderly average income variable in the equations estimated.

This widespread substitution of beds with nursing for beds without nursing may also mean that many patients in facilities without nursing care remained there when the facilities changed to beds with nursing care. The implication is that nursing home operators benefited by this process. The introduction of nursing care brought in higher payments for many patients who received a lower level of care earlier; the care thus provided was likely to have been beyond the levels warranted by the needs of many patients.[11] A further implication is that this expansion of bed capacity, by converting beds without nursing to beds with nursing, was not accompanied by corresponding increases of new investment. Much of the expansion was achieved by the simple reclassification of the facility to personal care with nursing or to nursing care after the mere addition of nursing personnel to meet the standards for facilities classified with nursing care.

The coefficient of the change in personal care beds without nursing was not statistically significant. However, its positive sign suggested that lower growth rates were associated with states that, on average, had relatively more personal care beds without nursing per 1000 elderly in 1973.

States with a high elderly average income (EINC), on the average, were shown to have experienced less growth from 1969 to 1973. The cross section equation, however, showed a positive sign for the coefficient of elderly income. This latter result suggests that the states with higher average elderly incomes also had a larger number of beds per 1000 elderly--a fact consistent with positive income elasticities. However, the number of beds grew at a slower rate among these same states. This finding was consistent with the premise that states with higher elderly income have relatively smaller Medicaid-eligible populations and, therefore, were less likely to have faster growth rates. Accordingly, the overall evidence on income of the elderly supports the hypothesis that state growth rates in nursing home bed capacity were significantly influenced by increases in Medicaid populations.

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[11] Attempts have been undertaken to reclassify patients to lower levels. In addition, the policy of promoting congregate care in consistent with the above arguments. See, for instance, the New York State Moreland Act Commission [84].

Finally, the coefficient estimates of the number of residents in mental institutions (MRT) imply that states transferred residents of mental institutions to nursing care facilities and therefore took advantage of federal matching funds in Medicaid [121]. States with a large mental institution population in 1969 showed faster growth rates than states with small populations in mental hospitals. Further, the results of the cross section equation exhibited that states where high numbers of residents remained in mental institutions were also the states which, on the average, had a lower nursing bed capacity per 1000 elderly.

In summary, results of the estimated equations following the form of equation II-(1) provided insights into the significance of some determinants of growth in nursing home capacity. The findings indicate, that, on the average, there was no difference in nursing home bed growth between states with flat-rate systems and states with cost-related reimbursement systems. Several control variables, however, were significant in explaining the variations in growth across the states.

Next we examine, by estimating equations of the form II-(2) and II-(3), whether the unexplained variations in the equations discussed above can be explained by the differences across states in each of the two types of reimbursement systems.

B. Elements of Cost-Related Reimbursement Systems

The results of equations used to estimate the impact of the elements of cost-related reimbursement systems on growth of beds and on bed capacity are shown in Table II-7. The seven elements used to describe the cost-related systems explained more than 37 percent of the variation in growth across states with such systems that was not explained by other factors included in equation II-(1). The implications of each of these elements and their coefficient estimates are discussed below.

1. Prospective versus Retrospective

Prospective systems, where the reimbursement rate is based on the costs of the individual facility, are generally considered to be more profitable than retrospective systems for both nursing homes and the state. The efficiency

TABLE II-7

RESULTS OF REGRESSION EQUATIONS ON RESIDUALS OF EQUATION II-(1) FOR STATES WITH COST-RELATED SYSTEMS

Variable	Change in Bed Capacity, 1969-73		Bed Capacity, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.585	6.334	-60.836	14.642
Independent	Coefficient	Standard Error	Coefficient	Standard Error
Constant	8.563	3.339	-59.893	7.735
PRO	- .147	2.476	4.898	5.735
ROE	2.090	2.839	4.086	6.576
FPR	-4.964	4.013	-11.202	9.296
ACCEL	-5.539**	2.306	7.716	5.340
TL	-4.368*	2.367	- 6.631	5.484
AUDIT	-2.562	2.807	3.272	6.503
ORR	-4.432*	2.506	-13.042**	5.807
R^2	.412		.409	
RSS	731.399		3925.37	
DF	24		24	
The dependent variable is defined as the estimated residual of the change in bed capacity equation shown in Table II-6.			The dependent variable is defined as the estimated residual of the 1973 bed capacity equation shown in Table II-6.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

argument contends that because a prospective rate is predetermined, nursing homes have an incentive to contain costs. That would be true if it were not for the fact that costs in the current year determine future rates. Prospective rates might encourage nursing homes to reduce current actual costs, but not necessarily the costs reported for the purposes of rate determination.[12] Prospective systems also reduce the risk regarding the amount of revenues to be received by removing the uncertainty associated with the costs that might or might not be allowed. Unanticipated increases in costs have to be borne by the providers in a prospective system, but not in a retrospective system. Under retrospective systems, the providers do not know until after the fact whether all the costs incurred will be reimbursed.

These factors suggest that prospective systems, on balance, should be more profitable for nursing homes than retrospective systems; our results failed to confirm that implication. Observed on the basis of the two methods of rate determination, the changes in bed capacity across states from 1969 to 1973 showed no statistically significant differences. Nor did the coefficient estimate in the 1973 cross section equation show that beds per 1000 elderly on the average were higher among states with prospective rates than states with retrospective rates.

2. Provisions for Profits

States adopted three ways to make payments for profits: return on equity capital (ROE), percentage of costs (PCST), and fixed amount per patient day (FPR). Each type implies a different set of incentives for the nursing home provider. The ROE provision relates the amount of profit directly to the book value of equity capital. The book value of equity depends upon whether depreciation is allowed, and, if so, at what rate. States that allow return on equity and depreciation create conflicting incentives for nursing home owners. The higher the claimed depreciation, the lower the book value of equity--and therefore a lower allowance for profit. In such states, one is likely to observe more sales of nursing homes. Sale and buy-back transactions are used to raise the book value of equity as well as to increase the amount of current depreciation.

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[12] It should be recognized that few state agencies have either the resources or the expertise to conduct thorough audits year in and year out. Dowling [27] highlights this inadequacy of regulating agencies in his study of prospective reimbursements in hospitals. Further, as Ginsburg [35] notes, econometric forecasting of general inflation, much less changes in input prices in selected industries, is far from an exact science.

The percentage of cost (PCST) and fixed amount per patient day (FPR) profit provisions, on the other hand, are independent of the amount of equity capital. These provisions for allowing profits create an incentive to reduce equity capital and to finance operations through debt. The usual deterrent of higher borrowing rates associated with lower equity is substantially mitigated in most Medicaid reimbursement systems because almost all states consider interest payments on debt legitimate expenses to be fully reimbursed.[13] These provisions also make the profit allowances independent of the depreciation payments and therefore relatively more attractive to the nursing home than a ROE provision. Whether a ROE provision acts as a deterrent to realizing high profits would depend upon how effectively the facilities could keep their equity levels high through sale and buy-back arrangements. There is less incentive for such manipulation under the PCST and FPR provisions.[14]

PCST and FPR profit provisions do not imply identical incentives for nursing homes. The amount of profits under a percentage of cost provision depends upon total costs. Because a one-to-one relationship between costs and equity is absent there would be profits for those providers with lower equity in nursing homes under PCST provisions. FPR, on the other hand, is a function of patient days of service provided; the largest profits go to those providers who have the highest occupancy rates. In the latter case, nursing home operators would also have little incentive to invest large amounts of equity capital in the facility.

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[13] Massachusetts, Minnesota, and New York have a maximum interest rate on debt that will be reimbursed, but this maximum is above the level of common borrowing rates and usually is not a binding constraint.

[14] Sale and buy-back arrangements are not to be confused with sale and lease-back arrangements. The latter arrangements are rental agreements and take advantage of the reimbursement systems that recognize market rents as costs [62].

Again, even though the implications of the various profit provisions are clear enough, the regression results of equation II-(2) under the cost-related systems failed to identify any one type of provision as clearly generating higher profits or growth than the others. Two dummy variables were used to determine the influence of the three provisions in which profits are specified. The estimates in Table II-7 indicated that states that provided for profits as a fixed amount per patient day (FPR) grew less rapidly than states providing profit payments based on return on equity.[15] At a somewhat lower confidence level, those states with an FPR provision also grew slower than states providing profit payments based on fixed percentage of costs. Furthermore, no statistically significant difference in growth patterns was found between states with return on equity provisions (ROE) and states with percentage of cost provisions (PCST). Finally, the results of the cross section equations on the profit provisions were similar. Those profit provisions associated with faster change were also associated with higher bed capacity per 1000 elderly.

There are two possible explanations for the finding that ROE led to higher profits than FPR but not necessarily higher profits than PCST. First, either the FPR amount was set very low by states using that provision, or second, the nursing homes in states with ROE provisions were able to overcome the constraints of the ROE provision through extensive sale and buy-back transactions.

3. Provisions on Depreciation

The method of depreciation determines the amount of depreciation expenses that can be claimed as a cost in a recordkeeping period. Depreciation claims can add to profit if the allowed depreciation expense exceeds the actual depreciation. This effect is mitigated, in states with return on equity profit provisions, by the corresponding reduction in the reimbursable equity base. However, accelerated depreciation formulas are never required; rather, reimbursement systems which permit accelerated formulas merely allow individual facilities to choose between accelerated versus straight-line methods. Presumably no facility would choose a depreciation formula which was less profitable. Thus one can unambiguously predict a nonnegative sign on the coefficient for the allowance of accelerated depreciation formulas.[16]

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[15] The standard error of this estimate is not shown in Table II-7 but can be derived from the coefficient estimates of ROE and FPR and the covariance matrix of the estimated regression equation.

The coefficient of the accelerated depreciation dummy variable (ACELL) was statistically significant and showed that states allowing accelerated depreciation grew at a slower rate by about five beds per 1000 elderly than states with a straight-line depreciation method. In light of the above arguments there were no immediate explanations for these apparent preverse results. The coefficient estimate in the cross-section equation, on the other hand, was positive though not highly significant. These results were consistent with expectations. States that allowed accelerated depreciation, on the average, did have a higher number of beds per 1000 elderly.

4. Total Payment Limits

The impact of limits placed on the total per diem payment rate (TL) depends upon how strict the limit is with respect to the cost of producing nursing services. Low limits are likely to result in a reduction of services provided, whereas high limits are likely to have no restrictive effects since the limits are not binding.

Consistent with the above reasoning, the coefficient estimate of the total payment limit variable (TL) in the change equation was found to be negative and statistically significant. This suggested that facilities in states with a per diem payment limit provision experienced relatively lower profitability and growth than nursing homes in states without the TL provision. Nursing home beds grew, on the average among these states, by about four beds per 1000 elderly less than the growth in states without total payment limits. Furthermore, the coefficient of this variable was also negative, although not statistically significant, in the cross section analysis. States with a TL provision had fewer beds per 1000 elderly in 1973 than states without such total per diem payment limits.[17]

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[16] See the more extended discussion of these issues in Part III of this report.

5. Enforcement and Containment of Cost

Reasonable-cost systems allow the provider to gain from manipulating accounting records. The extent of the manipulation and even falsification is likely to be governed by the severity of fines imposed for fraudulent accounting. States with effective review and auditing practices are likely to reduce considerably the scope for manipulation and reduce the incentive for growth in the industry under cost-based reimbursement systems.

The difference between states with and without a review or audit system was not found to be statistically significant, although the expected negative sign was associated with the coefficient estimate of audit variables (AUDIT) in the change equation. The cross section equation also did not yield a statistically significant coefficient estimate for the audit variable. A plausible explanation for these weak results might be that although several states have audit or review provisions, the audit and review procedures were not yet effectively implemented during 1969-73.[18]

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[17] States which have one or more individual cost category limits but no total payment limit were included in the same group as states which had no limits at all. Individual cost category limits were not examined because of the limited degrees of freedom available in estimating the equations. We believe the omission was not serious. Limits placed only on specific cost categories need not constrain total payments.

[18] For instance, Paul Bellows, Director of the Division of Administration, Georgia Department of Medical Assistance, reported that from 1971 through 1973 the State of Georgia employed only two auditors to review the cost reports of about 200 facilities. This review consisted of random checks for internal consistency and arithmetic accuracy. Except for administrators' salaries, no attempt was made to judge the reasonableness of other cost items. (Personal correspondence, November 9, 1977.) See also the New York State Moreland Act Commission Summary Report [85 , p.6] and other auditing information in Appendix B of this report.

The other variable used to measure the impact of the enforcement and cost containment provisions of the cost-related reimbursement system in the nursing home industry was a minimum occupancy rate for computation of fixed costs per patient day. High vacancy rates in nursing homes increase the average cost of providing services. Providers ave little incentive to fill beds if the cost of vacant beds can be covered from payments for occupied beds. Thus the absence of occupancy-rate regulations results in more time spent searching for more profitable patients, and increased capacity. States which use minimum occupancy rates for calculating the reimbursement payments limit the opportunity for large profits.

The results in Table II-7 conform the restraining influence of occupancy-rate provisions (ORR) on growth in the number of beds. Bed capacity in states with such provisions grew at a slower rate by about 4.5 beds per 1000 elderly from 1969 to 1973 than the number of beds in states without such provisions. The corss section equation also showed that bed capacity per 1000 elderly was, on the average, about 13 beds lower among states with occupancy rate provisions than states without these provisions. In both equations, the coefficient for the ORR variable was statistically significant.

6. Summary

In summary, the most pronounced impacts on growth were due to accelerated depreciation, total payment limits, and occupancy rate regulations. The presence of these elements in the cost-related reimbursement systems tended to lower the rate of growth in the bed capacity of the industry. Other elements in the cost-related systems appeared to have been inconsequential as far as influencing the growth of beds or explaining the variation in bed capacity per 1000 elderly across states in 1973.

C. Flat-Rate Systems

Only three variables were used to specify the differences in specific payment arrangements among the states with flat-rate systems. The results of the estimating equations are shown in Table II-8 for care-specific rates (SCR), group rates (GRT), and the flat rate amount (FRA).[19]

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[19] Negotiated versus nonnegotiated rate setting arrangements never appear to matter. This result suggested that the negotiating process may be largely cosmetic.

TABLE II-8

RESULTS OF REGRESSION EQUATIONS ON RESIDUALS OF EQUATION II-(1) FOR STATES WITH FLAT-RATE SYSTEMS

Variable	Change in Bed Capacity, 1969-73		Bed Capacity, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	1.172	7.932	1.452	17.843
Independent	Coefficient	Standard Error	Coefficient	Standard Error
Constant	-22.303	18.168	18.467	21.213
CSR	16.883**	5.566	11.920	14.146
GRT	4.354	3.957	15.210	11.014
FRA	8.819	7.863	-1.940	1.816
R^2	.455		.211	
RSS	514.241		3769.490	
DF	12		12	
	The dependent variable is defined as the estimated residual of the change in bed capacity equation shown in Table II-6.		The dependent variable is defined as the estimated residual of the 1973 bed capacity equation shown in Table II-6.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

The equations estimated examined the influence of each of the three variables on the growth of nursing home beds from 1969 to 1973 and bed capacity in 1973. The results of the regressions in all cases were generally consistent with expectations, although the coefficients were not always statistically significant. The influence of group rates and the flat rate amount was insignificant in both the change equation and the cross section analysis. However, states that specified separate rates for different types of care (CSR) grew at a more rapid rate than states that did not set separate care-specific rates. The difference between these two groups of states was both statistically significant and very large. On the average, states with separate rates for different types of care grew by 17 more beds per 1000 elderly during 1969 and 1973 than other states with flat-rate reimbursement systems. The result of the cross section equation also supported these findings. On the average, states with care-specific rates had about 12 nursing care beds per 1000 elderly more than other flat-rate states.

The estimated relatively rapid growth rate among states with care-specific rates under a flat-rate system was fully consistent with the incentives faced by the providers. Nursing homes can receive higher payment by obtaining an upward classification of patients, but without necessarily increasing the level of care provided. Such reclassification, to the extent it is possible, should increase the profitability of the nursing home industry and probably accelerated the industry growth in the state [84].[20]

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[20] We also attempted to estimate the growth equations using only proprietary facilities. These equations did not perform as well as the equations reported here which included all facilities. The results of the growth equations for proprietary facilities are reported in Tables E-4 through E-6 in Appendix E. These equations had less explanatory power but the magnitude and signs of coefficients were very similar to those found in the equations including all facilities.

In addition to the equations which explained changes in bed capacity, we also estimated other sets of equations to . . .

V. SUMMARY OF FINDINGS AND CONCLUSIONS

This study was undertaken to evaluate the nursing home growth and reimbursement system experiences of states from 1969 to 1973. We assessed how the different elements of the reimbursement systems influenced profits and, therefore, the growth in the nursing home industry. We attempted to determine whether the evidence drawn from the experiences of the states corroborates the commonly espoused beliefs regarding the different features of the reimbursement systems.

(continued)
. . . attempt to explain variation in various aspects of the quantity and quality of nursing home services. Four other sets of dependent variables were used as follows:

- A set of variables which measured the mix of nursing home beds by Medicare/Medicaid certification status,
- A set of quality of care proxies,
- A set of variables which measured the mix of funding sources, and
- A set of variables which measured the average number of beds per facility and per capita number of facilities.

The bed capacity by certification status variables consisted of the ratios of Medicaid skilled nursing and Medicare certified beds to total beds, for both proprietary and all facilities. The Medicaid variables could only be used in a cross section analysis for 1973, and not as changes over 1969-73, since data from the required earlier source did not meet certain quality and reliability checks, as discussed in Appendix A.

Quality of care was measured by an index of nursing staff inputs, weighted by wage rates for types of nurses.

Source of funding was measured by the ratios of Medicare and Medicaid residents to all residents, for both proprietary and all facilities. The Medicaid to total patient ratios could be used only as a 1973 cross section because of failure of earlier data to meet a quality test.

Finally, we attempted to explain variation in average facility size for both proprietary and all facilities, in the . . .

The results of the study provided no great comfort for those who vigorously support either one type of reimbursement system or another, or those who have argued for one or another reimbursement provision within these systems. The adoption of a flat-rate or a cost-related system by states did not differentially affect the growth of beds per 1000 elderly, nor was there any difference in prospective or retrospective methods of rate determination under the cost-related systems. Different growth rates and profitability were not explained by these major features of reimbursement systems.

In the case of cost-related systems, the provisions imposed for the containment of cost and fraud, such as total payment limits, minimum occupancy-rate requirements, audits, and reviews did generally show the expected impact on profitability and consequentially the growth of nursing home beds across the states. The slower growth in bed capacity in the states that allow accelerated depreciation, however, was confounding. Furthermore, the analysis failed to yield any conclusive evidence on the influence of the different profit payment schemes adopted by the states with cost-related reimbursement systems.

In the case of flat-rate systems, a clearly significant finding was the positive relationship between care-specific flat rates and the growth in the nursing home beds. The nursing home industry in states with such flat-rate systems grew more rapidly, and had more beds per 1000 elderly in 1973 than states with other flat-rate systems. Other flat-rate system characteristics--such as flat rates for groups of facilities or the amount of the flat rate--showed results in the right direction, but were statistically inconclusive with respect to any impact on profits and growth of the industry.

(continued)
. . . proportion of all beds which are proprietary, and in the number of facilities per capita elderly.

In general, the analysis of these equations, including various combinations of control variables, was not fruitful. The results are discussed in Appendix E, and other information on the dependent variables is found in Appendix A.

Substantial evidence of influence on growth was found among nonreimbursement system characteristics and variables. The "control variables"--such as personal care without nursing bed capacity, the numbers of mentally ill residents in hospitals, and elderly income--yielded results that supported the hypothesis that the Medicaid programs in general were liberal. Higher growths in states that had larger personal care without nursing bed capacity, a larger number of mental residents in nursing homes, and lower elderly income were all consistent with this conclusion.

In summary, the results of this study failed to support the concept that cost-related reimbursement rates are an effective vehicle to address the problem of reasonable payments for nursing home services for public patients. The evidence generated by our analyses demonstrated that there was wide variance both in parameter estimates and in residuals, and estimated coefficients were not always of the expected sign. Administrators of reimbursement systems often make assertions about the effects of changes in certain elements which hold only if nursing home entrepreneurs do not respond by changing their behavior. But the fact is that nursing home operators do respond to any new regulation in ways which minimize its impact on the nursing home and its profitability. Prediction of impacts which do not take this response of nursing home entrepreneurs into account will generally be incorrect. Accordingly, we conclude that the HR 21 HEW guidelines and the attempts of states to fine-tune reimbursement systems may be based on concepts that have little validity in the real world of the nursing home industry. There are many strong incentives and many methods to evade both the overall intent of a reimbursement system and its individual elements.

In suggesting these conclusions, we recognize that this study in this Part of the Project was confronted with a limited number of observations from which to analyze the numerous features of the state reimbursement systems. The estimates in some cases failed to pass rigorous standards of statistical analysis. But in spite of the caveats, the findings strongly suggest that all is not well in the state Medicaid systems for purchasing nursing home services. Reimbursement systems are in place, and they are working--albeit with difficulties and uncertain results. A critical, empirical examination of the impact of different reimbursement systems was long overdue. Certainly the results of these analyses raise serious issues in terms of the effectiveness of manipulating elements in the setting of reimbursement rates or of fine-tuning the current policies of cost-related reimbursement systems. Further research in this area, it is hoped, will be forthcoming and will provide more evidence upon which to suggest alternatives to the current approach to the reimbursement of nursing home care.[21]

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[21] Although this study did not include an analysis of alternatives to the cost related reimbursement systems, there are reasons to explore greater emphasize upon competition among nursing home firms as a means to control the industry's growth and increasing costs of nursing home services. A quarter of a million private patients and 20,000 nursing homes may create an effective market for nursing home services. The solution to the nursing home reimbursement problem might not lie in reimbursement based on costs--that the regulators cannot accurately estimate in any case--but in payments based on market pricing information on private patients [62]. See the critique of cost related reimbursement and recommended changes in Part VI below.

PART III

STATE STUDIES OF NURSING HOME RATES OF RETURN

PART III

STATE STUDIES OF NURSING HOME RATES OF RETURN

I. INTRODUCTION

The determination of the costs of capital inputs under a cost-related reimbursement scheme for nursing home care is a major problem. There are inherent difficulties in estimating the value of capital stock utilized in addition to allocating payments for capital services on the basis of resource ownership. Some capital inputs are rented, others owned by the firm, and still others obtained through borrowed funds. A complicating feature is that accounting records do not correspond to economic concepts of capital and cost. Rental expense for the services of rented capital inputs and interest expense on borrowed capital funds are readily observable from the market and recorded as transactions in the accounts of the firm. However, real depreciation expense and the return on the entrepreneur's investment that is required to bid these capital services away from alternative productive uses, can only be estimated approximately from the available financial records of the firm. Accounting formulas have been used to allocate depreciation expense across production periods but the accounting return to owner capital is a residual, hardly a sound basis for estimating directly the opportunity cost of the entrepreneurial capital.

The importance of the rates of return to capital invested in nursing homes lies in the relationship between real rates of return and size and growth of the industry. If this return is higher than that available in similar alternative investments, capital inputs will flow to the nursing home industry. If the rate is lower, capital owners will withdraw their resources from the industry.

In the State Studies component of the project we use the financial records of nursing homes in the states of Colorado, Georgia, New York, and Washington (i) to show that rates of return based on total assets are preferred to rates of return on equity for purposes of reimbursement;

(ii) to demonstrate that book rates of return can be adjusted to obtain rates of return that more closely approximate the real returns in the nursing home industry; (iii) to estimate rates of return on total assets for nursing homes in the four states; (iv) to compare estimated average rates of returns across states and nursing home groups within states; and (v) to examine the relationship among estimated rates of return, rates of growth, and reimbursement policies in these four states.

Knowledge of past rates of return is thus useful for several reasons. One reason is to establish a bench mark for the rate of return required to induce or retard industry growth. Recently, for example, nursing home owners have contended in several state law suits that the Medicaid authorities are paying too little for capital services to justify continued investment in the industry. In the absence of historical data on rates of return against which to judge these claims, the contention is difficult to evaluate.

A second reason to estimate historical rates of return is to determine whether or not differentials exist across different sectors of the nursing home industry. Variations in rates of return will determine which types or groups of facilities will expand and which will contract. Such differences would arise if reimbursement policies were particularly advantageous to one class of homes or another, such as corporations versus proprietorships or partnerships; large versus small homes; facilities that lease capital versus those that own, and so forth.

Finally, rates of return may reflect the effects of different reimbursement systems. Both the type of reimbursement scheme or various elements in the reimbursement plan, such as specific provisions or rates of return on equity capital, profits or depreciation allowances, could influence the rates of return actually received by nursing homes. The consequences of reimbursement systems on rates of return should be known if reimbursement policies are to achieve the desired policy goals in the regulation of reimbursement of nursing home services.

The remainder of Part III is divided into five sections. Section II briefly discusses the data used to compute rates of return in the four states. The next section discusses the issues underlying the alternative specifications of rates of return and describes how the book values of return can be adjusted to approximate more closely the real rate of return. The results of the computed rates of return for various groups of nursing homes are set forth in Section IV. In the last section some implications of the findings for reimbursement policy are considered.

II. DATA

The data for the State Studies were extracted from the annual or biannual nursing home facility cost reports and financial statements filed with the state Medicaid reimbursement agency. Reports were requested for all facilities for each year, 1971-75 in the states of Colorado, Georgia, and Washington. Reports from a random sample of 50 percent of the New York facilities were sought. In all, 781 useable reports were obtained from Colorado covering 200 different facilities; 656 such reports from Georgia for 265 different facilities; 733 reports from New York for 194 facilities; and 879 useable reports from 290 facilities in Washington. Data thus came from 3067 useable cost and financial reports submitted by 949 nursing homes to the state Medicaid agency over the period 1971-75 in the four states.

The four states were chosen on the basis of several factors. First, their reimbursement policies differ in a number of important ways (Table II-3). Further, each of these states had required facility cost reports for at least three years in the period under study, and the necessary data were available. Finally, the Medicaid authorities in these states agreed not only to make the data available, but also to provide assistance in interpreting the cost reports and their use.

The collection of the data, the process of coding and editing, methods for verification of the data, and how the variables used in the analyses were constructed are discussed in detail in Appendix B. Between 16 and 37 data items were extracted from each report and used to construct 23 variables used in various analyses. The means and standard deviations of these 23 variables are found in Tables B-8 and B-9. These variables were manipulated to determine rates of return for different groups and categories of facilities, as well as providing various financial ratios used in the estimation of riskiness of investment in nursing homes considered in Part III of this Report. Those characteristics of nursing homes which were used to classify facilities included capacity, occupancy rate, debt to asset ratios, and the ratio of private to total patient days. Data on these characteristics are found in Table B-10.

III. STRATEGY FOR ESTIMATING RATES OF RETURN

There were several issues which had to be resolved in the estimation of historical rates of return. Fundamental among them is the difference between real rates of return on capital and accounting or "book" rates of return.[1] Investment decisions are based on real rates

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[1] The real rate of return on capital (in a discrete time model) is defined as:

$$\alpha_t = \frac{V_t - V_{t-1}}{V_{t-1}}$$

where

$$V_t = \sum_{t=1}^{N} (R_t - C_t)(1 + i)^{-t} + S(1 + i)^{-N}$$

and V_{t-1} is defined similarly.

α_t = real rate of return in period t;

V_t = discounted net income value of the asset at the end of period t;

V_{t-1} = discounted net income value of the asset at the end of period t-1;

i = market rate of interest;

R_t = cash receipts received in period t;

C_t = cash expenditures incurred in period t;

N = productive life of an investment;

S = salvage value of the investment after N periods. . . .

of return, market factors, and expectations regarding future earnings but only accounting records are available for computing rates of return. Thus our initial step was to examine how the accounting data might best be used to approximate the real rates of return. This process led us to analyze whether total assets or owner's equity should be used as a basis to determine the book rates of return, how accounting depreciation should be accommodated, and what to do about adjusting asset and/or income data for general inflation. We computed rates of return using several alternative definitions and attempted to establish the preferred specification for purposes of reimbursement policy. The choice of the preferred definition was based on criteria that minimized the divergence between the real and book rates of return and is discussed in greater detail below.

A. Real versus Book Rates of Return on Capital

The appropriate rate of return to estimate is the real rate of return. Investment decisions are based on the real rate of return. Productive capital will shift from one use to another as differentials arise between the real rate of return to capital and its present use and competing alternatives. Although the realized rate of return to capital determines the income of capitalists, its expected value relative to rates of return of other similar uses also determines whether capital will enter or leave this particular industry. In the absence of major new technology, the rate at which capital enters or leaves an industry determines whether or not the industry's capacity grows or contracts.

(continued)
The accounting or book rate of return is defined as

$$r = \frac{Y_t - D_t}{K_t}$$

where

r = book rate of return in period t;

Y_t = net income flow from operations in period t;

D_t = depreciation charges in period t;

K_t = net book value of assets at the beginning of period t.

The available data on returns and capital values, however, are found in the accounts of the firm that are kept in accordance with conventional accounting practices. The divergence of these records from market values constitutes the issue to be resolved in establishing the preferred specification of book rates of return on capital for purposes of reimbursement in the nursing home industry.

Real and book rates of return on capital differ on both conceptual and operational grounds. The real rate of return is based on the expected value of future streams of receipts and expenditures and is independent of historical values of the investment. The book rate of return, on the other hand, is independent of future expectations and is based on values of accounting transactions. The finance and accounting literature discusses these differences and accepts the real rate of return as the theoretically superior measure. The real rate of return, however, has limited usefulness since it cannot easily be observed [Solomons, 106; Vatter, 147; Solomon, 105].

The real rate of return for a firm will reflect the economic life of all assets of the firm, and the expected amount of receipts and expenses (net income) for each year into the future. It will account for changes in the age structure of a firm's capital stock as new assets are acquired and old assets wear out. Obviously, the direct estimation of real rates of return is a major, if not an impossible task. *Ex ante* estimates can be made if projections of all future receipts and expenses could be made with reasonable confidence. To our knowledge such an empirical estimation has yet to be attempted in a regulatory setting. Simulation models, as in the case of the New York Moreland Act Commission study, have been attempted [86]. Although these models are helpful for estimating impacts of alternative policy prescriptions, they have not been accepted as a rate-setting tool [McCaffree, 60].

The book rate of return is more readily calculated. All values can be taken directly from the accounting records of the firm. There are, however, two basic reasons why the book rate of return will diverge from the real rate. First, accounting measures of net income do not correspond to the economic definitions of income. Second, accounting measures of the capital stock (the rate base) diverge from its market value.

1. Net Income

Accounting measures of net income are based on net cash flows realized in a particular period. The economic definition of income, however, is the maximum potential consumption in a period which would not entrench on wealth. Even ignoring nonpecuniary income flows (which are captured in the real rate of return), cash flows may poorly reflect consumption opportunities.[2] Goods may be expensed in the current period even though they provide services over several periods. Revenues for services provided may be deferred from one accounting period to the next.

2. Asset Value

The more serious problem with book rates of return arises in the treatment of asset valuation by conventional accounting practices. Assets are typically carried on the books at historical cost (purchase price) less some allowed depreciation, instead of evaluating the invested capital at its current market price. Historical cost will diverge from market value for several reasons. First, the market continually reevaluates assets based on current market conditions. Revisions of market expectations, either in the economy as a whole or specific to the industry, may reevaluate assets either up or down, and cause the book value of assets to diverge from real values. Furthermore, accounting statements record amounts in current, rather than constant dollars. During a period of inflation, book accounts lose meaning rapidly, quite apart from the issue of capital gains or losses.[3] A calculated book rate of return at any one period in time can be very sensitive to the specific book entries of that period. The divergence between real and book rates of return of a firm due to inflation is related to the age distribution of the assets (age by purchase dates), although the exact nature of this relationship is difficult to specify. The relationship is complicated by the continual acquisition and liquidation of assets and depends upon the schedule of the allowed rate of depreciation. The sensitivity to specific entries of a single period can be mitigated somewhat by averaging book rates of return over several years.

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[2] We ignore nonpecuniary returns at our peril, since this is a principal mechanism for avoiding regulatory constraints.

[3] In March 1976, the SEC issued Accounting Series Release #190 which required the disclosure of certain replacement cost information in Form 10-K. The SEC approach focuses on specific price changes in the general price level. The SEC defined replacement cost as "the lowest amount that would have to be paid to obtain a new asset of equivalent operating or productive capability." This release applies to companies whose inventories and gross land, plant, and equipment are valued at $100 million or more and exceed 10 percent of total assets. We know of no nursing home companies which fall into this category.

Accounting conventions, also, are such that recorded depreciation bears little resemblance to the decline in value of physical assets. There is no reason to expect that the value of a given asset, such as a nursing home facility, declines in accordance with straight-line or sum-of-digits accounting formulas. Indeed, useful life tables and accelerated depreciation schedules are specifically designed to encourage investment and not to reflect the actual rate of depreciation of the capital stock.

A further problem with accounting depreciation records is that maintenance expenditures are recorded as operating expenses rather than investments in increased asset durability. The fact that an entrepreneur can _choose_ the real depreciation rate for his capital (subject to some constraints, of course) is not recognized in accounting records.

3. Summary

The above accounting practices and problems, as well as the general problem of asset reevaluation from inflation, indicate that the real rate of return on capital will be different from the book rate of return. Precisely the extent or direction of the divergence cannot be predicted _a priori_, since the conditions of inflation as well as the precise accounting practices will affect the results. Inflation and upward market valuation of assets will make the real rate of return lower than the book rate, since net income, which is the numerator in the rate of return ratio, will be in current dollars and the book value of assets, which is the deonominator, is in historical dollars. However, the effect of accounting depreciation practices on the relationship between the real rate and the book rate of return is ambiguous. Even though the value from allowed depreciation will exceed the value of real depreciation over the same period, this fact effects both the numerator and the denominator of the rate of return ratio. By recording the allowed rate of depreciation as a current cost, instead of the real rate, the value of net income of the firm is understated. Further, net capital stocks understate the true value of capital since asset values have been depreciated at an unrealistically rapid rate.

In the following subsections, we examine in further detail how the book rates of return can be adjusted to approximate the real rate of return to capital using accounting records. First we discuss the choice of total assets or equity capital as the rate base, and seek the preferred rate base for purposes of reimbursement. Second, we examine how book rates of return can be adjusted to correct for depreciation accounting conventions, and for inflation and rapidly changing prices. Finally, we define the specification used to estimate the rates of return for 1971-75 in the nursing home industry in four states.

B. The Rate of Return Base: Total Assets versus Owner's Equity

The rate of return to capital is essentially the ratio of a net income flow measure to a measure of capital stock value. The rate of return can be estimated using the overall income to all capital invested in the nursing home, regardless or ownership or methods of financing the facility's assets. Or the rate can be estimated by including only the income to capital owned by the entrepreneur,which would exclude payments for debt interest. In the former case, the rate base is total assets; in the latter case it is owner's equity. The issue is whether total assets or owner's equity capital is the more appropriate rate base for purposes of formulating reimbursement policy.[4]

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[4] The "overall rate of return" is subsequently used to identify the rate or return on total assets. "Equity rate of return" or "rate of return on equity" identifies the rate of return on owner's equity capital.

There are several reasons from both empirical and theoretical points of view that support the use of total assets as the appropriate rate base rather than the return on equity capital. We discuss first the theoretical issues involved in the choice of the rate base followed by a discussion of the empirical considerations. Finally we use the financial records of nursing homes in four states to show that estimates of overall rates of return performed better than the estimates of rates of return on equity, based on the criterion of dispersion in rates of return across nursing homes.

1. Theoretical Issues

Theoretical reasoning suggests that it is the overall rate of return that is the preferable basis of capital reimbursement, not the return on equity. The nursing home entrepreneur is faced with two different sets of incentives under the two payment arrangements. Since the behavior of the firm can affect the costs of nursing home services which the state reimburses, the implications of different sets of implicit incentives require examination.

Reimbursement schemes that pay a return on equity capital and cost-reimburse debt interest payments discourage the entrepreneur from searching for the lowest cost debt capital. The reason for this effect is clear: there is no reason to seek more favorable borrowing terms unless at least a part of the gain accrues to the entrepreneur. Since searching for favorable borrowing rates is a costly activity, and there is no gain to the firm, little or no searching is done. Banks, financial institutions and other lenders also recognize the "pass through" nature of interest expense. Accordingly, average interest costs can be expected to be higher than they otherwise would be. The exact magnitude of the higher costs is uncertain. If the total debt capital in the nursing home industry in 1973 was on the order of 6 billion dollars, the additional annual interest cost for each one percentage point increase in the interest rate over what would otherwise have been the case would amount to 60 million dollars.[5] Further, easier access to capital funds markets is possible by guarantees of reasonable debt interest payment. Thus reimbursement may lead to more extensive capital inputs. Roomier and more spacious quarters for residents and employees, and a more comfortable environment for the entrepreneur can be provided through larger loans per bed, even with the same amount of equity capital invested. The entrepreneur obtains nonpecuniary gains as well as providing additional benefits to patients. The cost of these activities, however, where they are happening, are likely to be borne by the government. There is an added return to additional capital investment even if it is debt financed. High capital investment would result in a higher depreciation allowance. The additional allowed depreciation on the larger quantity of capital inputs would increase reimbursement payments, and, to the extent the allowed depreciation exceeds the actual depreciation, it would both improve the entrepreneur's cash flow position and his implicit income. One study concluded that the reasonableness of standards determining the original cost of an asset (facility) that is to be depreciated is potentially significant in controlling total reimbursement costs. A doubling of capital expenditures per bed, as occurred in nonprofit facilities in New York and Maryland, could increase reimbursement levels by as much as five percent, or 600 million dollars annually if extended to all facilities in the nation [61].

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[5] The 6 billion dollar figure was estimated from the 1,174,000 beds reported by the National Center for Health Statistics [130] and the average indebtedness per bed reported in the four states in this study (Table B-8). The $60 million estimate may also be slightly too large since some states did use "reasonableness" tests in reimbursing interest on some types of loans.

Another area in which reimbursement schemes based on equity capital suffer a distinct disadvantage relative to a policy based on the overall rate of return is in administrative complexity. Once interest payments become reimbursable expenses, there is a clear incentive to contract for debt at artifically high rates of interest, in the knowledge that the payments will be treated as a reimbursable expense.

Regulations that require that borrowing be done "at arm's length" are a recognition of, but by no means a solution to, this problem. The problem is not that nursing home owners will attempt to disguise ridiculously costly loans obtained from friends, relatives, and their own personal accounts, as a business expense--such straightforward fraud is relatively easy to detect. However, the effect of the policy is to create a more subtle set of conflicting forces around even legitimate credit transactions. The borrower is more willing to take out loans and the lender more willing to make larger loans, than a pure assessment of the borrower's market situation would imply, since both know the state reimbursement agency will bear some of the cost, clearly so in those states with cost-related reimbursement systems. The lender is willing to extend credit to nursing homes which would not be creidt-worthy in an open market, because of the reimbursement policy. Both parties profit from loans which would not ordinarily be made in an open market to a firm in an unregulated industry.

The indentification and monitoring of all loan transactions is extremely costly, if not impossible. No such problem arises, however, if the regulated rate of return is a return of total assets, rather than on owner's equity. The incentives for the borrower to borrow and for the lender to lend at above-market rates of interest are eliminated. The entrepreneur is free to arrange ownership of assets in any way, and the question of who owns the assets becomes a moot issue. The auditing and monitoring required to track down the legitimacy of mortgages, notes, loan transactions, rental-lease arrangements, and the reasonableness of interest payments can largely be avoided. Regulation of non-arms-length transactions, in fact, become unnecessary. Market forces automatically accomplish precisely what the regulations and such laws attempt but cannot achieve. The administrative complexity of the reimbursement scheme is considerably reduced by computing and using an overall rate of return.[6]

Apart from the incentives created for excessive debt financing and capital use by reimbursing based on return on equity, there are several empirical considerations which suggest that the overall rate of return can be estimated more accurately than the return on equity capital.

2. Empirical Considerations

The differences in the accuracy of estimating alternatively specified rates of return stem from the way the accounting records are maintained. The book values do not reflect real values mainly because (i) the claimed depreciation rather than real depreciation is subtracted from values of assets and equity in each period, and (ii) the book values are not adjusted for price changes and therefore, do not reflect current values.

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[6] For a more detailed discussion of these and related issues, see McCaffree, et al., [62].

The divergence between book values and real values because of depreciation is the same for both assets and equity. Rates of return based on equity, however, are likely to show a larger divergence from the real rates than the overall rate of return, for the same difference between the real values and book values of equities and assets. The greater divergence between book and real rates for equity than for the overall rate of return is due to two facts: (i) there is a nonlinear relationship between the rate of return and the rate base, and (ii) the value of total assets is larger than equity value. For example, assume that $100 net income was reported for book values of $1000 for total assets and $300 for equity. Assume further that the real values exceeded book values of both assets and equity by $50. The result is a book rate of return on equity of .33 when the real value is .286; the corresponding book overall rate of return will be .10 when the true value is .095. The difference in the book and real equity rates of return is 4 percentage points while the same difference in the overall rates of return is only one-half percentage point.

It should also be noted that the larger the debt proportion of total assets, the larger will be the dispersion between the values of book equity rate of return and the real equity rate of return. Since equity to debt ratios are of the order of 1/2 to 1/3 in the nursing home industry (see Table B-8), equity rates of return are likely to be very sensitive to depreciation entries and other accounting practices of the firm.[7]

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[7] Proprietorship, partnership and for-profit corporations have equity debt ratios much smaller than for the industry as a whole. For example, proprietorships and partnerships in both Colorado and New York have ratios of mean equity and mean total liabilities of 1 to 20.

Further, facilities could have negative equities (net worth).[8] Negative equity occurs when a firm borrows to purchase capital assets and then depreciates those assets in the accounting records faster than it pays back the loan. As a result, asset values fall below liability values and a negative net worth results. This negative equity is frequently the artifact of the depreciation rate that is greater than the true depreciation rate; of course, a negative equity makes computation of an equity rate of return meaningless.

In addition, the use of equity rates of return in a reimbursement system allows an entrepreneur to alter his equity/liability ratio to maximize his returns. If interest expense is a separate expense item, and if the allowed debt interest rates are higher than the allowed rate of return on equity as has been the case in many states, entrepreneurs in closed family corporations, for example, will shift their equity to short-term notes from themselves, or some similar manipulation, in order to increase their payments for invested capital. Equity rates of return after such book transactions become largely a meaningless concept. On the other hand, overall rates of return treat debt and equity as one composite and, therefore, book transfers between equity and debt can not result in any advantage to the entrepreneur.

Finally, accounting records do not adjust book values for inflation. Accordingly, book rates of return are overestimated relative to real rates of return during periods of inflation. Book valuation is undervalued relative to real valuation of both assets and equity. The important point to note is that the amount of undervaluation due to inflation is the same for both the book value of assets and the book value of equity. Once again, this undervaluation will result in a larger divergence of book rates of return from real rates of return in the case of the equity rate of return than in the case of the overall rate of return.

In summary, the facts are that book values of both equity capital and total assets diverge from their real values. The influence of this divergence on the rates of return is more severe in the case of equity capital than in the case of total assets. The effect of this divergence in a reimbursement system would be that ex post rates of return will vary substantially across providers. The principles underlying accounting practices suggest, however, that this variation is likely to be much smaller in the case of overall rates of return than for equity rates of return. In addition, equity rates of return are also sensitive to the size of the debt component of assets. Consequently, providers can improve their returns by manipulating their debt to equity ratios. Differential treatment of equity and debt, associated with reimbursement systems that pay return on investment based on equity, also creates an incentive to transfer equity to debt or vice versa depending upon whichever obtains a higher rate. All these features provide a strong justification for using overall rather than equity rate of return for purposes of reimbursement. Further, support for this conclusion was also found in the computation of rates of return from the financial records of nursing homes.

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[8] Almost one-fourth of the facilities in each state in the sample of facilities studied reported negative equity. See Tables B-8 and B-9.

3. Evidence on Rates of Return

We computed average book rates of return on owner's equity and on total assets for nursing homes in the states of Colorado, Georgia, New York, and Washington.[9] Separate estimates were made of average book rates by state and type of ownership and are shown in Table III-1.

Two important differences between equity and overall rates of return stand out. Ex post average book equity rates of return are substantially higher and have greater variation associated with them than the overall rates of return.[10] The greater dispersion of equity

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[9] The samples used to calculate each average rate of return are not identical. The equity rate of return sample is a subset of the overall rate of return sample. Facilities which had negative equity were included when the rate of return on total assets was calculated but were excluded when the return on equity was calculated. The exclusion of just those facilities with negative equity is somewhat arbitrary, but the effect is to cause estimated rates of return on equity to appear more "reasonable" and less variable than they in fact are.

[10] These differences are not so pronounced in the case of nonprofit nursing homes. We discuss the differences between nonprofit and for-profit nursing homes in Section IV. Here we are only interested in confirming the superiority of the overall rate of return to the equity rate of return.

TABLE III-1

AVERAGE FACILITY BOOK RATES OF RETURN, BY RATE BASE, TYPE OF OWNERSHIP AND BY STATE 1971 - 1975 (Standard Deviation in Parentheses)

State, Type of Ownership	Equity Base		Total Asset Base	
	Number of Facilities	Rate Percent	Number of Facilities	Rate Percent
Colorado:				
Proprietorships and Partnerships	29	68.5 (107.2)	43	18.4 (21.2)
Corporations	91	31.9 (77.9)	119	8.5 (12.9)
Nonprofit Facilities	29	-8.9 (77.7)	38	-4.9 (16.3)
All Facilities	149	31.2 (87.1)	200	3.1 (17.3)
Georgia:				
Proprietorships and Partnerships	23	41.2 (107.3)	27	4.9 (20.1)
Corporations	145	23.0 (78.7)	190	8.7 (15.4)
Nonprofit Facilities	41	-21.0 (65.8)	48	-2.8 (10.3)
All Facilities	209	16.4 (81.9)	265	6.3 (15.7)
New York:				
Proprietorships and Partnerships	31	50.3 (76.3)	124	11.1 (24.8)
Corporations	20	45.4 (77.6)	24	7.9 (15.3)
Nonprofit Facilities	44	2.7 (9.7)	46	1.7 (4.0)
All Facilities	146	34.9 (67.1)	194	8.4 (20.9)
Washington:				
Proprietorships and Partnerships	71	44.4 (136.3)	88	11.3 (19.1)
Corporations	151	16.1 (95.5)	176	3.1 (15.7)
Nonprofit Facilities	24	5.7 (17.3)	26	4.3 (17.9)
All Facilities	246	23.3 (105.4)	290	8.9 (17.1)

rates than of overall rates of return is confirmed by the differences in standard deviations of the two sets of rates of return shown in Table III-1. Further, the fact that the evidence is consistent across the four states and different types of ownership lends additional support to the conclusion that equity rates of return are more volatile than overall rates of return.

The evidence of greater variation in equity rates relative to overall rates of return is as expected. The divergence of equity capital value from its real value is likely to lead to much larger divergence in the book rate from real rates than in the case of the overall rates of return. The evidence of high equity rates is in keeping with the proposition that higher allowed debt interest rates encourage high debt to equity ratios. The resultant low equity amounts in the denominator of the rate of return formula in turn yield rates with high average values and variations.

4. Summary

We conclude that the use of overall rates of return is more appropriate than the equity rate of return for reimbursement systems which endeavor both to maintain equity across nursing homes and to approximate real rates of return from accounting records. Empirically more meaningful data can be estimated and at the same time more policy-relevant rates can be determined. The greater instability and volatility of equity capital rates relative to overall rates support the use of the latter. Both administrative simplicity as well as the direction of incentives for efficient use of capital resources lie with the use of the overall rate of return.

Because of these considerations, the empirical determination of the differences in *ex post* rates of return across groups of nursing homes is confined to overall rates of return. Book overall rates, however, diverge from real rates due to accounting treatment of depreciation and inflation. For meaningful comparison of overall rates, it is important to adjust the book rates for these two factors to more closely approximate the real rates. How the adjustments may be made and the validity of those adjustments is discussed in the following subsections.

C. Adjusting the Accounting Treatment of Depreciation

Durable assets provide a flow of services over their usual lifetime. Even if the annual quantity and quality of the service flow are constant, market value of the asset will decline continuously because fewer and fewer useful years of service remain to be utilized.[11] Correct estimation of real rates of return to capital requies that this decline in market value of the asset be accurately measured.

We observed above that the definition of depreciation conventionally used by accountants bears little resemblance to real economic depreciation. Typical accounting procedures depreciate assets by equal dollar amounts over some assumed lifetime (the straight-line method of depreciation) or use an accelerated procedure such as "double-declining balance" or "sum of the digits." Under any of these methods, ceteris paribus, there is always an incentive to depreciate a capital asset as rapidly as legally permissable in order to maximize the present value of the tax savings. Tax regulations promote artifically rapid depreciation both by allowing accelerated depreciation techniques and by permitting artifically short asset-lifetime guides. In addition, the general practice of regarding most maintenance expenditures as current operating costs rather than additional investments in the asset, also acts to make depreciation charges greater than real depreciation.

In order to take account of the divergence between accounting depreciation and real depreciation, book rates of return must be corrected to approximate the real rates of return. The correction for the divergence involves both the numerator and the denominator of the rate of return ratio. An overall book rate of return, which assumes book depreciation records are accurate accounts of economic depreciation, would be estimated as follows:

$$\text{III-(2)} \qquad r = \frac{NI + INT}{TA}$$

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[11] If the rate of incrase in price from inflation and product demand is greater than the depreciation rate, at least for a period within the life of the asset, the market value may rise even as the expected life of the asset declines. The nominal depreciation, as the difference in the discounted values of the expected stream of services of an asset at the beginning and the end of an accounting period, could be negative.

where

r = rate of return on total assets;

NI = net income (book value);

TA = total assets (book value);

INT = interest payments (book value).

Accordingly, if accounting depreciation exceeds economic depreciation, both the denominator of total assets and the net income in the numerator are too small. Book value of total assets is net of all recorded accounting depreciation and is understated. Net income excludes amounts set aside in the current period for accounting depreciation, and is also understated.

It is not possible to say a priori what is the direction of bias in the book rate of return, since both the numerator and the denominator are understated. The correct (real) rate of return, however, includes at least part of current depreciation in the numerator and part of accumulated depreciation in the denominator. This can be shown as follows:

$$\text{III-(3)} \qquad r' = \frac{NI + k_1\ CD + INT}{TA + k_2\ AD}$$

where

r' = rate of return;

CD = current depreciation (book value);

AD = accumulated depreciation (book value);

k_1, k_2 = parameters between zero and one;

and the remaining terms are defined as in equation III-(2)

The particular values of k_1 and k_2 depend on the true economic rate of depreciation. If book records are true reflections of economic depreciation then $k_1 = k_2 = 0$. If assets do not depreciate at all, then $k_1 = k_2 = 1$.

The crucial information in adjusting the book rate of return for the divergence in book and real depreciation is the values to assign to k_1 and k_2. We had no direct evidence which permitted us to estimate the true k values. We assumed, however, that these values were closer to one than to zero, and accordingly estimated adjusted book rates of return as if no depreciation took place, i.e., $k_1 = k_2 = 1$.

We adopted a zero rate of depreciation for estimating the real rate of return on the basis of two major considerations. First, during the period of the state studies, the demand for nursing home services continued to increase relative to other industries, and capital asset values were increasing to some extent, independent of general inflation.[12] Second, unrecorded additional investments in nursing home assets through maintenance expenditures on present assets were reducing any real economic depreciation.

It is possible for zero depreciation to result in a lower estimated rate of return, even though this may seem paradoxical. A close inspection of equation III-(3) reveals the reason. Both an income and an asset account are affected by the adjustment. If

$$\text{III-(4)} \qquad \frac{k_1\ CD}{k_2\ AD} > \frac{NI + INT}{TA}$$

then $r' > r$; and *vice versa*. The ratio on the left hand side of III-(4) is a monotonically declining function of the average age of the firm's capital assets. When a new asset is acquired, accumulated depreciation for that asset is zero, and grows to cover the total asset value over its depreciable lifetime. Conversely, current depreciation for the asset is either constant in every period or, under an accelerated depreciation technique, declines over the lifetime of the asset. Since the nursing home industry has been growing, and growing industries tend to have relatively new capital stocks, the proposed adjustment for depreciation should result in higher estimated rates of return to capital.[13]

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[12] To the extent that certificate of need laws increased the costs of entry or restricted entry, the value of assets in the industry would also tend to rise.

[13] In 1971, over two-thirds of these depreciable assets in the nursing home industry in Washington State were less than five years on the books, and almost none for over nine years [McCaffree and Parke, 61]. The growth rates discussed in Part I of this report are not substantially different.

The computation of average facility rates of return by state adjusted for zero depreciation are shown in Table III-2. This adjustment for depreciation not only increased the estimates of average rates of return, but also the estimates exhibited a shrinking standard deviation. The higher estimated average rates after adjustment suggest that the assets in the industry are relatively new, i.e., their purchase date is not very old, a reflection of a growing industry or an industry where there is a high turnover in ownership. Both these features are true of the nursing home industry. Furthermore, the lower standard deviation associated with the average values lends further support to the fact that adjusted rates better approximate the real rates of return. In an industry which has a large number of proprietary providers, competitive forces will tend to reduce the variation in the real rates of return received by different providers. The smaller standard deviations can therefore be argued to be evidence which shows that the adjustment procedure used resulted in more closely approximating the real rates. The fact that the standard deviation is observed to decline in the cases of all states, for both subgroups of nursing homes by types of ownership and all facilities lends additional support to our claim that the proposed depreciation adjustment provided results according to our expectations.

In summary, book depreciation clearly exceeds real depreciation, and some adjustment of the accounting data and book rates of return was necessary in order to approximate more closely the real rates of return on capital in nursing homes. The assumption of zero depreciation accomplishes that objective. Subsequently, we use the assumption of zero depreciation in the further computation of rates of return on nursing home capital. Further adjustment in accounting and book records for the effects of inflation on the divergence between book and real values of assets, and on the divergence between book and real rates of return, is considered next.

D. Adjustment for Inflation

Some adjustment to book rates of return was required in order to correct for the effects of inflation on asset values and to approximate the real rate of return on capital more accurately. Book rates

TABLE III-2

AVERAGE FACILITY OVERALL RATES OF RETURN BEFORE AND AFTER ADJUSTMENT FOR ZERO DEPRECIATION, BY TYPE OF OWNERSHIP AND BY STATE, 1971 - 1975

(Standard Deviation in Parentheses)

State, Type of Ownership	Rate of Return	
	Unadjusted Asset Base	Adjusted Asset Base
Colorado:		
Proprietorships and Partnerships	18.4 (21.2)	17.6 (15.3)
Corporations	8.5 (12.9)	10.5 (11.2)
All Profit Facilities	11.1 (16.1)	12.4 (13.0)
All Facilities	8.1 (17.3)	10.0 (14.0)
Georgia:		
Proprietorships and Partnerships	4.9 (20.1)	6.9 (19.6)
Corporations	8.7 (15.4)	10.9 (14.2)
All Profit Facilities	8.3 (16.0)	10.4 (15.0)
All Facilities	6.3 (15.7)	8.8 (14.1)
New York:		
Proprietorships and Partnerships	11.0 (24.8)	12.1 (20.7)
Corporations	7.9 (15.3)	9.4 (11.4)
All Profit Facilities	10.5 (23.5)	11.7 (19.5)
All Facilities	8.4 (20.9)	9.9 (17.4)
Washington:		
Proprietorships and Partnerships	11.8 (19.1)	13.2 (15.3)
Corporations	8.1 (15.7)	10.5 (11.3)
All Profit Facilities	9.4 (16.9)	11.4 (13.3)
All Facilities	8.9 (17.1)	11.0 (13.6)

of return are biased upwards relative to real rates of return during periods of inflation. Asset values, apart from changes in relative prices, will increase in dollar terms during periods of inflation. Book values of assets are stated in terms of historical dollars, and consequently rate of return estimates which use book value of total assets in the denominator are biased upward relative to real rates.

The bias in book rates of return can, in principle, be corrected by adjusting book values of total assets. Consider the following "simplest" case: A firm purchases a single, nondepreciating asset at time t at price P_t and holds it for a period k. During the period a general price index increases from I_t to I_{t+k}. The correct capital base in period t+k is then:

$$P_t \frac{I_{t+k}}{I_t} .$$

The precise correction in capital values, however, is difficult to estimate in the typical firm that has different types and ages of assets. The direction of bias is known, but the magnitude depends on a number of factors that cannot always be known with exactness. For example, the age of the capital stock is difficult to determine because there are distinct types of assets, such as land, buildings, and various types of equipment, that have different expected useful lifetimes. In addition, even homogeneous assets do not all have the same age, even if each has the same expected lifetime.

The annual reports to reimbursement authorities from which our data for the state studies were taken did not contain the details on age, remaining useful life, and correct book value for each asset in each facility for which an adjustment for inflation was required. Accordingly, several steps and assumptions were used to estimate the effect of inflation on asset values. Since book values reflect the depreciation practices, the same assumption of zero depreciation was also made here as explained above. Hence, only the composition and age of the facilities' assets were determined.

Assets were divided into three categories: land, buildings and equipment. Where these values were directly reported by the facilities, these data were used. However, the composition of assets in these categories was not always reported by the facility and the missing information had to be estimated. Total book asset values for all assets were available for all facilities and hence the book values were allocated to the three categories of assets from the total in the same proportions as those estimated separately for each state by taking the average of the asset composition ratios for 25 randomly selected firms that reported detailed asset information.

In estimating the average age of assets by category, the age of an asset was defined as the number of years the asset was owned by the facility. Land and buildings were assumed to have been purchased at the same date. For depreciable assets, age was determined by the ratio of accumulated to current depreciation. In some cases it was necessary to make estimates of the age for these categories.[14]

The final step in adjusting for inflation was inflating the asset values by the appropriate prices indices. Three different price indices were used--the Implicit GNP deflator for land, the Construction Cost Index of the U.S. Department of Commerce for buildings and the Bureau of Labor Statistics Wholesale Price Index #12 of furniture and household durables for equipment. The sum of the inflated values by asset category was then used in the denominator of the overall rate of return ratio to compute inflation-adjusted rates of return.

The proposed inflation adjustment in the case of the data we had required several assumptions regarding the age and composition of assets before the inflation indices could be applied. These assumptions would not have been required if the entire financial report of each facility were available to us. In this latter case, the age and composition of assets could have been obtained directly for each facility from the facility's financial records and the inflation correction factor applied directly to each category of assets. The effect on the computed rates of return of the assumptions we made is not obvious. We however, chose to compute both (1) inflation and depreciation adjusted overall rates, hereafter referred to as inflation-adjusted rates, and (2) depreciation-adjusted rates, hereafter referred to as simply adjusted rates. Furthermore, because our assumptions to compute age and composition of assets are likely to introduce larger errors for smaller aggregations of facilities,[15] inflation-adjusted rates were computed only for statewide averages of rates of return. If age and composition data were directly available, a more precise rate of return estimate could have been obtained both for subgroups of facilities and statewide average rates of return.

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[14] Further details regarding the exact process of estimating the composition and age of assets are found in Appendix B.

E. Specifications Employed in the Study

Sections A through D have provided the justification for the specification of rates of return that we use to examine the differences in rates of return across states and between subgroups of nursing homes within states. The question of specification is important because only accounting financial data are available but real, not book rates of return are the relevant measure for both investment decisions and a basis for reimbursement. Accordingly, we showed that the use of total assets as a rate base is more appropriate than equity capital. The use of total assets permits a closer approximation of average real rates of return, reduces incentives for accounting manipulation and encourages greater efficiency in borrowing capital. Second, we demonstrated that the book overall rates can be adjusted through an assumption of zero depreciation to obtain rates which are better approximations of the real rates of return than unadjusted rates of return. Finally, an adjustment for inflation is warranted to approximate more accurately real rates of return.

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[15] There was reason to believe that variables used to define groups or classes of facilities would be correlated with age and composition of assets, in which case the estimates of rates of return on subgroups would be biased.

Accordingly, for purposes of empirical investigation we defined and computed adjusted and inflation adjusted rates of return as follows:

III-(5) $$r = \frac{NI + CD + INT}{TA + AD}$$

where

r = adjusted overall rate of return;

NI = book net income;

CD = book current depreciation;

INT = book interest payments;

TA = book total assets;

AD = book accumulated depreciation.

Also,

III-(6) $$r_I = \frac{NI + CD + INT}{CTA}$$

where

$$CTA = L \cdot \frac{I^L_{t+k}}{I^L_t} + B \cdot \frac{I^B_{t+k}}{I^B_t} + E \cdot \frac{I^E_{t+k}}{I^E_t}$$

and

r_I = inflation adjusted overall rate of return;

CTA = estimated current value of total assets;

L = estimated purchased value of land;

B = estimated purchased value of buildings;

E = estimated purchased value of equipment;

I^L_t, I^B_t, and I^E_t = price indices for land, buildings, and equipment respectively in period t;

k = number of periods since the purchase period.

In the use of equation III-(5) above, we have also computed simple average and weighted average overall rates of return for different classes of nursing homes by state. The simple average is the average rate of return to individual facilities, i.e., the rates of return for each facility were added and then divided by the number of facilities. The weighted average was computed using the ratio of facility asset value to the total asset value of all facilities in a group of nursing homes. The weighted average rate, therefore, for a group or the industry is the ratio of the total value for all variables in the numerator of equation III-(5) for all facilities in a group to the total value of assets at the time of purchase of all facilities in that group. We therefore refer to simple and facility averages or to weighted and groupwide (industrywide) averages.

On the basis of the above, we examined the rates of return in the states of Colorado, Georgia, New York and Washington to determine:

(1) Statewide: The differences between average adjusted and inflation adjusted and between simple and weighted average adjusted overall rates of return for all facilities across states;

(2) For groups of nursing homes:

  (a) The differences in average facility and industrywide adjusted rates of return across groups of nursing homes by type of ownership and by ownership status within a state and across states;

  (b) The relationship between average facility adjusted rates of return and facility characteristics such as the number of beds, the occupancy rate, the debt to asset ratio, and the ratio of private patient days to total patient days.

  (c) How much of the variation in average facility adjusted rates of return can be explained by the characteristics of nursing homes specified in (b) above;

(3) For reimbursement policies: How the state average adjusted rates of return are related to growth and reimbursement policies of the states.

The results of the examination of each of these five items are presented in turn in the next section in empirical results.

IV. EMPIRICAL RESULTS

The findings of our examination of the computed overall rates of return have been presented under three headings. The first considers the differences and levels of returns across the four states. Second, the differences in rates of return by classes of facilities and the effects of characteristics of facilities on these rates are considered. Finally, the relationship between rates of growth, reimbursement policies and the computed rates of return is discussed.

A. Statewide Rates of Return

Table III-3 summarizes the simple averages of adjusted and inflation adjusted overall rates of return for all facilities in the four states. The adjustment for inflation increases the value of the rate base and, therefore, lowers the estimated average rate of return. The reduction in the adjusted rates of return resulting from taking inflation into account was statistically significant in the case of all states.[16] The reduction was more pronounced in Georgia than in New York and Washington. Given the inflation adjustment formula, III-(6), the difference in the reduction of the rates of return reflects a relatively older average age of assets, or, a longer period of time since the purchase data, in Colorado and Georgia. Greater activity in the sale and purchase of facilities in New York and Washington may well have reduced the average length of time since the purchase date on facilities in those states relative to Colorado and Georgia [60, 86].

Individual facility rates of return were generally the same across Colorado, Georgia and New York and only somewhat higher in Washington. No statistically significant differences in the simple averages of adjusted or inflation adjusted existed across states, except for

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[16] Throughout this analysis statistical differences in the means (averages) were tested by performing t-tests using sample means and standard error of sample means. The means were considered to be different if the hypothesis of their equivalence could be rejected at the 95 percent level of confidence.

TABLE III-3

SIMPLE AVERAGES OF ADJUSTED AND INFLATION ADJUSTED OVERALL RATES OF RETURN FOR ALL FACILITIES, BY STATE 1971 - 1975 (Standard Errors in Parentheses)

State	Number of Facilities	Average Overall Rate of Return		Change Due to Inflation Adjustment
		Adjusted	Inflation Adjusted	
Colorado	200	10.0 (1.0)	7.8 (0.9)	-22%*
Georgia	265	8.8† (0.9)	6.6# (0.8)	-25%*
New York	195	9.9 (1.2)	8.4 (1.2)	-15%*
Washington	290	11.0† (0.8)	9.1# (0.8)	-17%*

*Rejected the hypothesis that average adjusted and inflation adjusted rates within a state were the same at 95% level of confidence.

†Rejected the hypothesis that average adjusted rates in Georgia and Washington were the same at 95% level of confidence.

#Rejected the hypothesis that average inflation adjusted rates in Georgia and Washington were the same at 95% level of confidence.

Washington. The highest average rates were found in Washington, but were only significantly different from the average adjusted and inflation adjusted rates in Georgia and not from the rates in the other two states. The apparent differences in average rates across states were misleading. There was substantial variation in individual facility rates across states and consequently led to the conclusion that individual facility rates were about the same in all states and only slightly higher in Washington (or slightly lower in Georgia) relative to the rates in other states.

The differences between simple and weighted averages of adjusted overall rates of return across the four states are summarized in Table III-4. The weighted average rates of return were lower than the simple average rates in all states and the differences were found to be statistically significant. The largest difference was found in New York and the smallest difference in Washington.

The fact that the simple average rate was larger than the weighted average rate in every state suggests a lower average rate of return for larger facilities than for smaller ones. The weighted average rate is an industrywide rate, and therefore, those facilities with larger asset holdings were lowering the weighted rate relative to the simple average rate. Thus, this finding implied that rates of return among all facilities declined as the total value of investment (equity plus debt) rose. Accordingly, since Washington data showed the smallest difference between the simple and weighted averages, the difference between rates of return received by large and small facilities was relatively small. For New York, where the simple-weighted averages differ most, the difference between rates of return in large and small facilities was relatively the greatest among the four states. These implications, however, must be interpreted carefully, because the extent of the difference between large and small facility rates of return depended upon the size distribution of facilities in a state. For any given difference between the simple and weighted average rates in a state the difference in rates between large and small facilities would be larger if the ratio of the numbers of large to small facilities in a state was low and would be smaller if the ratio was high.

TABLE III-4

SIMPLE AND WEIGHTED AVERAGES OF ADJUSTED OVERALL RATES OF RETURN FOR ALL FACILITIES, BY STATE 1971 - 1975

(Standard Errors in Parentheses)

State	Number of Facilities	Overall Rate of Return		
		Simple Adjusted Average	Weighted Adjusted Average	Difference[b]
Colorado	200	10.0 (1.0)	6.1[a] (0.7)	-39%*
Georgia	265	8.8 (0.9)	6.0 (0.4)	-32%*
New York	195	9.9 (1.2)	5.3 (0.5)	-46%*
Washington	290	11.0 (0.8)	9.1[†] (0.5)	-17%*

[a] One large nonprofit government facility was deleted from this computation.

[b] The difference between the two rates is a percent of the simple adjusted rate.

*Rejected the hypothesis that simple adjusted average rates and weighted adjusted average rates were the same at 95% level of confidence.

[†] Rejected the hypothesis that average weighted adjusted rates of Washington were the same as the average weighted rates of Colorado, Georgia and New York at 95% level of confidence.

For the states of Colorado, Georgia and New York, any comparison of simple average rates or weighted average rates across these states revealed no statistically significant difference between the average rate of any two states. The nursing home industry as a whole in the State of Washington, however, received a relatively much higher rate of return on total assets industrywide than the industry obtained in the other three states. In fact, our computations suggest that the industrywide rate may have been as much as 50 percent higher than in other states.

Finally, there was no evidence in Table III-3 or III-4 that these rates were either too "low" or too "high" relative to payment for capital in similar circumstances. The seemingly low industrywide average rates of return should not be compared to the more common 10 to 12 percent rates of return on equity capital in the stock market. These nursing home rates are overall rates of return, based on total assets. Thus, whether the 5.3 percent weighted adjusted rate in New York was "too low" or the 9.1 percent rate in Washington was "too high" are judgments to be made in relation to policy objectives not specified in this analysis. We observe only that the computed 9.1 percent for the industry in Washington was higher than for the other three states, and that the difference between the rates in Washington and the other states was a statistically significant one.

Briefly, the examination of statewide results can be summarized as follows:

- Average adjusted individual facility rates were higher than the industrywide adjusted rates in all the four states.

- Average adjusted individual facility rates were higher than the average inflation adjusted individual facility rates in all four states.

- Average adjusted individual facility rates, average inflation adjusted facility rates and the industrywide rates individually between any two states were not significantly different from each other except:

- both the average adjusted and average inflation adjusted rates were significantly different between Georgia and Washington, and
- the industrywide adjusted rate in Washington was significantly higher than the industrywide adjusted rates in each of the other three states.

B. Differences in Rates of Return for Groups of Nursing Homes

The rates of return have been computed and examined for nursing homes by type of ownership, and by whether facilities are leased or owned. In addition, the association of several facility characteristics with variations in rates of return was analyzed by computing correlation coefficients for each variable.

1. Type of Ownership

The rates of return for four different groups of nursing homes were examined by type of ownership. First, the differences in average rates between proprietary and nonprofit nursing homes and then the differences in average rates between proprietorships and partnerships, and corporations were examined.

Proprietary and Nonprofit Rates. Table III-5 summarizes the simple and weighted adjusted average rates for proprietary and nonproprietary (nonprofit) nursing homes in each of the four states. Both the simple and weighted rates were significantly different between proprietary and nonproprietary facilities in all the four states, except for the simple rate in Washington. The rates of return were significantly lower among the nonprofit facilities.

The lower overall rates of return among nonproprietary nursing homes appeared to be associated with or resulted from larger asset holdings per bed for the nonprofits than for proprietary facilities. Average values of total assets of nonproprietary to proprietary facilities were approximately 6 to 1 in New York, 4 to 1 in Colorado, and 2 to 1 in Georgia and Washington (Table III-6). Equivalent difference in bed capacity was, however, not observed. Average bed capacity among nonprofit homes was higher relative to the for-profits

TABLE III-5

SIMPLE AND WEIGHTED AVERAGES OF ADJUSTED OVERALL RATES OF RETURN FOR PROPRIETARY AND NONPROPRIETARY FACILITIES, BY STATE
1971 - 1975
(Standard Errors in Parentheses)

State	Overall Rates of Return					
	Simple Adjusted Average			Weighted Adjusted Average		
	Proprietary	Nonproprietary	Difference[a]	Proprietary	Nonproprietary	Difference[a]
Colorado	12.4 (1.0) n=162	-0.4 (2.2) n=37	-103%*	10.3 (1.0) n=162	1.9 (1.4) n=37	-82%*
Georgia	10.0 (1.0) n=217	1.5 (0.8) n=48	- 85%*	9.8 (0.5) n=217	2.4 (0.4) n=48	-76%*
New York	11.7 (1.6) n=148	4.4 (0.7) n=47	- 62%*	13.3[†] (0.7) n=148	3.2 (0.5) n=47	-75%*
Washington	11.4 (0.8) n=264	6.7 (3.1) n=26	- 41%	10.4 (0.5) n=264	5.4[#] (0.7) n=26	-50%*

[a] The difference between the rates is a percentage of the proprietary rate.

*Rejected the hypothesis that average rates of proprietary and nonproprietary facilities within a state are the same at 95% level of confidence.

[†] Rejected the hypothesis that weighted adjusted average rate of proprietary facilities in New York is the same as the weighted adjusted average rate of proprietary facilities in Colorado, Georgia and Washington respectively at the 95% level of confidence.

[#] Rejected the hypothesis that weighted adjusted average rate of nonproprietary facilities in Washington is the same as the weighted adjusted rate in Colorado, Georgia, and New York respectively at 95% level of confidence.

TABLE III-6

MEAN ASSETS PER BED, FOR PROPRIETARY AND NONPROPRIETARY FACILITIES, BY STATE 1971 - 1976[a]

State	Proprietary			Nonproprietary		
	Mean Bed Size	Mean Assets Per Facility ($000)	Assets Per Bed	Mean Bed Size	Mean Assets Per Facility ($000)	Assets Per Bed
Colorado	90	$363	$4033	90	$1630	$18,111
Georgia	88	413	4693	83	954	11,493
New York	129	747	5790	183	4200	22,950
Washington	87	306	3517	95	705	7,421

[a] Data summarized from Table B-8.

only in New York and Washington. In the former, the bed capacity was, on average, 42 percent higher, but in Washington only 10 percent higher (Table III-6). Investment per bed, therefore, was substantially higher among nonprofit homes than the proprietary group. Since all facilities received a rate determined by the same state reimbursement system, it is not surprising that the overall rates of return for nonprofit facilities were 50 to 100 percent smaller than those of the proprietary facilities. The difference in overall rates of return between the two groups of facilities was, however, the lease pronounced in Washington.

A comparison of the rates across states showed that the average simple adjusted overall rates of return were not statistically dissimilar either for proprietary facilities or for nonproprietary facilities. On average, individual facilities received similar rates of return in the four states considered here.

In the case of the average groupwide overall rates of return, two statistically significant differences were observed. First, the average weighted adjusted rate for proprietary firms was higher in New York than in the other states. In the remaining three, the industrywide rate for proprietaries was about the same. On the other hand, in the case of nonprofit homes, the rate was significantly higher in Washington than elsewhere and about the same in the other three states. These findings are closely related to the data above that the average industrywide rate was significantly different only in the case of Washington facilities (Table III-4), where it was the highest. The higher rate for all facilities in Washington appears due to the relatively much higher rate received by Washington nonproprietaries than was obtained by that group in other states.

We also observed in examining the data in Table III-4 that industrywide rates of return were considerably lower than the simple average of individual facility rates. The average weighted groupwide rates for proprietary facilities in Table III-5, however, were only marginally lower than the simple average of individual facility rates in three states, and *in fact*, was higher in the State of New York. Thus, among proprietary facilities, there was little evidence that lower rates of return were made by larger facilities or facilities with larger asset holdings. In the State of New York, the evidence indicated that the larger proprietary nursing homes, on average, did better than smaller firms. This fact may indeed account for an average size of a proprietary facility in New York that was about 40 percent larger than in the other three states (Table III-6).

Corporate and Noncorporate Rates. The average overall rates of return for proprietary facilities grouped as corporations or as proprietorships and partnerships (noncorporate) in each state are shown in Table III-7. In general, the noncorporate facilities received a somewhat higher average rate of return than corporate facilities. However, in the case of simple average adjusted rates no statistically significant difference was observed across corporate and noncorporate facilities in three of the four states. In Colorado, noncorporate facilities received relatively higher rates of return than the corportate facilities. In case of the weighted average adjusted rates there also was no statistically significant difference between corporate and noncorporate facilities in three of the four states. However, a significant difference in these rates was observed in Washington where proprietorship and partnership facilities received, on average, higher rates than facilities in corporations.

The higher average rates of return for the noncorporate group of facilities relative to the corporate group were difficult to interpret. The evidence, in the first instance, was hardly conclusive that the noncorporate rate was the higher of the two average rates. There was a large variation in the rates of return earned by individual facilities in both corporations and proprietorships or partnerships. This variation was generally smaller among the corporate than noncorporate groups. On the other hand, in two cases the noncorporate rates of return were actually significantly different and higher than for the corporate facilities, and in most other cases the rates were higher for noncorporate than the corporate rates. Secondly, the finding that proprietorships and partnerships received higher rates stands in contrast to the observed trend in the industry that this type of

TABLE III-7

SIMPLE AND WEIGHTED AVERAGES OF ADJUSTED OVERALL RATES OF RETURN FOR CORPORATE AND NONCORPORATE PROPRIETARY FACILITIES, BY STATE

1971 - 1975

(Standard Errors in Parentheses)

State	Overall Rates of Return					
	Simple Adjusted Rate			Weighted Adjusted Rate		
	Corporate	Noncorporate	Difference[a]	Corporate	Noncorporate	Difference[a]
Colorado	10.5 (1.0) n=119	17.6[†] (2.4) n=43	+68%*	9.9 (0.8) n=119	12.9 (1.6) n=43	+30%
Georgia	10.9 (1.0) n=190	6.9[†] (3.8) n=27	-28%	9.7 (0.6) n=190	10.8[#] (1.0) n=27	+11%
New York	9.4 (2.4) n=24	12.1 (1.9) n=124	+29%	10.8 (2.0) n=24	13.8 (0.8) n=124	+26%
Washington	10.5 (0.9) n=176	13.2 (1.7) n=88	+26%	9.4 (0.6) n=176	14.8 (0.9) n=88	+56%*

[a] The differences between the rates is a percentage of the corporate rate.

*Rejected the hypothesis that the average rates of corporate and noncorporate facilities within a state are the same at 95% level of confidence.

[†] Rejected the hypothesis that the simple adjusted average rate of facilities in Colorado is the same as the simple adjusted average rate of facilities in Georgia at 95% level of confidence.

[#] Rejected the hypothesis that the weighted adjusted rate of facilities in Georgia is the same as the weighted adjusted overall rate of facilities in New York and Washington respectively at 95% level of confidence.

ownership was declining. It is paradoxical that relatively higher average rates were received by a group and its overall size declined. Finally, there may be explanations for the observed relationships, but none were very strong. The higher rates of return could marginally include some wages for proprietors and partners, although this was also possible for the returns in family held corporations. There also may be particular tax advantages to the noncorporate form or retained earnings in the corporations that affected the computed rates of return to provide the relationships observed in these results. In some cases, proprietors and partners must pledge private nonnursing home assets as security for business loans, and the relatively higher return for noncorporate facilities may reflect these circumstances. Or the higher average rates of the noncorporate sector were a reflection that some proprietorship or partnership facilities were very efficiently managed and received higher rates of return than both the corporate facilities and other noncorporate homes. These facilities nevertheless raised the average rates of noncorporate facilities over the average rates of corporate facilities.

Turning to comparisons of rates across states, the average individual facility and groupwide rates for corporate facilities did not show any significant differences. In the case of noncorporate facilities, however, some differences across states were observed. The highest simple average rate was found in Colorado and was statistically different than the average individual facility rate in Georgia. Average facility rates of noncorporate facilities in both Colorado and Georgia were found to be statistically the same as the average individual facility rates in New York and Washington.

The groupwide weighted rate of return for noncorporate facilities in Georgia was lower than the similar rates of return in New York and Washington. The rates in the latter two states were not statistically different from the rate in Colorado, however. In brief, the examination of average rates of corporate and noncorporate facilities across states showed that the only difference across states was that noncorporate facilities in Georgia in general made relatively lower rates of return than similar facilities in the other states.[17]

In summary, the rates of return by type of ownership showed that:

For proprietary versus nonprofit facilities:

- Both the simple and weighted average adjusted rates of return were significantly higher for proprietary than for nonproprietary facilities in all four states, except for the simple rate in Washington;
- The simple average adjusted (facility) rates of return for both proprietary and nonprofit facilities in each state were not significantly different from those in each of the other three states;
- The weighted average adjusted (groupwide) rates of return for both proprietary and nonprofit facilities in each state were not significantly different from those in each of the other three states, with two exceptions:

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[17] In Georgia the proportion of sole proprietorships and partnerships were a much smaller proportion of all proprietary facilities than was the case in other states; a fact that would be implied by relatively lower rates of return associated with sole proprietorships and partnerships in Georgia.

State	Growth Rate		Proportion of Nursing Homes that are not Incorporated
	Beds	Beds/ 1000 Elderly	
Colorado	46%	33%	.27
Georgia	84%	61%	.12
New York	42%	40%	.84
Washington	98%	79%	.33

  - for proprietary facilities the rate in New York was significantly higher than the rate in other states, and

  - for nonprofit facilities the rate in Washington was significantly higher than in Georgia and New York.

For corporate and noncorporate facilities:

- Noncorporate facilities received a somewhat higher average rate of return, either simple or weighted, than corporate facilities, although the evidence was not conclusive;

- Both simple average facility rates and the weighted average groupwide rates for corporate facilities between any two states were not significantly different from each other;

- Both simple average facility rates and the weighted average groupwide rates for proprietorships and partnerships were generally the same across states, except that these facilities in Georgia made lower average rates of return than similar facilities in other states.

2. Rates of Return by Facility Ownership Status

All nursing homes in the four state samples were also classified into two groups: those that own and those that lease facilities.[18] Only the average rates of return for proprietary nursing homes were considered because very few nonproprietary nursing homes lease facilities.[19] Only simple average adjusted rates of return were computed in each of the four states.

The average adjusted rates of return of proprietary nursing homes in each of the four states by facility ownership status are shown in Table III-8. When homes were grouped by whether the facility was owned or leased, the rates of return for proprietary nursing homes exhibited only one statistically significant difference either across states or across ownership status groups. In the State of Washington there was a significant difference between the average rates received by nursing homes that owned their facilities and nursing homes that leased their facilities. The later group reported rates of return 50 percent higher than the nursing homes that owned facilities.

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[18] Since explicit data on facility ownership was not directly available, ownership status was inferred from data on rental payments. The exact procedure is described in Appendix B. In the case of certain nursing homes this procedure was not possible and those nursing homes have been excluded from this analysis.

[19] In fact, among the 159 nonproprietary nursing homes in the four state samples only 9 nursing homes were identified as renting facilities.

The unusual result for Washington nursing homes that rented relative to those that owned facilities appears understandable in relation to the reimbursement plan in effect over a part of the 1971-75 study period. A flat amount per patient day was allowed as profit--"contingency income" under the plan. In addition, those homes which rented facilities were allowed the rent, which generally was a current market rental rate, as a "pass through" to the owner of the facility. However, for owners of facilities who also operated the facility, the state reimbursement system allowed mortgage interest and only depreciation on the facility at historical values. Hence the owner received neither a return on equity or a depreciation allowance on current values as was ordinarily included in the rental allowance to those nursing homes that rented facilities. Thus the allowed profit of a flat amount per patient day--the contingency income--was spread over a larger investment for the owner than for the home that rented, with the result that homes which rented, clearly would be expected to obtain a much higher rate of return than those homes which owned the facility [60]. Nothing in the reimbursement methods of Colorado, Georgia or New York was found which systematically favored nursing homes based on the ownership status of the facility.

The average adjusted rates were also examined separately for proprietary corporate and noncorporate groups of nursing homes to confirm whether differences in rates existed between nursing homes that owned and those that leased facilities within each group. Comparisons were also made across states. In general, these results yielded few statistically significant differences between owned and leased groups

TABLE III-8

SIMPLE AVERAGE ADJUSTED OVERALL RATES OF RETURN FOR PROPRIETARY NURSING HOMES, BY OWNERSHIP STATUS OF FACILITIES AND BY STATE

1971 - 1975

(Standard Errors in Parentheses)

State	Ownership Status of Facilities		
	Owned	Leased	Difference[a]
Colorado	12.5 (1.1) n=110	13.1 (4.4) n=28	+ 5%
Georgia	10.2 (0.5) n=159	10.5 (4.8) n=43	+ 3%
New York	12.5 (1.2) n=50	11.1 (2.9) n=77	- 5%
Washington	9.6 (1.0) n=140	14.7 (2.0) n=71	+53%*

[a] The difference between the rates is a percentage of the "owned" rate.

*Rejected the hypothesis that the simple average adjusted rates for proprietary nursing homes that owned and those that leased facilities are the same within a state at 95% level of confidence.

within a state or between states. These results were consistent with expectations because the return to capital of the firm *per se* should be independent of whether assets, such as the facility in a nursing home firm, were owned or leased. Results of this more detailed examination are found in Appendix E.

In summary, we conclude that:

- Simple average adjusted facility rates for proprietary nursing homes that own facilities and those that lease facilities were not significantly different from each other in any state except Washington where the group leasing facilities had a significantly higher average rate of return than a similar rate for the group owning facilities, most likely a result of the reimbursement system in that state.

3. Rates of Return and Facility Characteristics

An examination was undertaken to identify the relationship, if any, between the adjusted overall rate of return and the characteristics of facilities. In particular, the following six variables regarding facility characteristics were specified:

- Facility size, by the number of beds;
- Average occupancy rate;
- Debt to asset ratio;
- Ratio of annual average private patient days to total patient days;
- Type of ownership, a dummy variable with a value of 1, if the facility was incorporated;
- Facility ownership status, a dummy variable with a value of 1 if the facility was owned.

The choice of these variables was somewhat arbitrary. For the most part, the characteristics were factors commonly referred to as possibly influencing the actual rates of return received by nursing homes. *A priori*, there was little theoretical justification for predicting the relationship between these characteristics and the computed adjusted returns. The purpose of the examination was to confirm the association between each of the characteristic variables and the adjusted facility rate of return when the values of the other specified characteristic variables were held constant. The association was determined by computing partial correlation coefficients and testing the null hypothesis that the partial correlation coefficient was equal to zero.[20] The results are set forth in Table III-9.[21]

Several significant partial correlation coefficients were obtained. The strongest consistent relationship across states was observed between the adjusted overall rate of return and the debt to asset ratio. The higher the proportion of debt relative to book value of assets, the lower was the adjusted overall rate of return. This result may imply that the age of the asset was relevant in this relationship. The book value of assets is sensitive to age of the assets, i.e., the period since the purchase date. Book value of assets is the difference between the purchase value of the assets and the accumulated depreciation. Thus, ceteris paribus, the older the facility the larger would be the book value of debt to asset ratio. Accordingly, the observed negative relationship between the adjusted overall rates of return and book debt to asset ratios of facilities might be a reflection of lower rates of return being made by relatively older facilities. The existence of such an association between age and rate of return was not established conclusively, but its plausibility was supported by the fact that there were frequent sales and a proliferation of sale and buy-back arrangements in the nursing home industry in the early seventies. Additional profits could have been made by altering the age (purchase date) of the facility (assets).

Highly significant partial correlation coefficients were also obtained in all states for the corporate type of ownership. Incorporated nursing homes were associated with relatively lower rates

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[20] This examination was limited to only proprietary facilities. The extreme differences between the distribution of rates of return of proprietary and nonproprietary facilities makes examination of all facilities not a very useful way to elicit the underlying association between the facility characteristics and the rate of return. The nonproprietary facilities were not examined separately because of their small numbers in each state and very large variation in the rates of return among them.

[21] The mean and standard deviation of facility characteristic variables are shown in Table B-10 in Appendix B.

TABLE III-9

PARTIAL CORRELATION COEFFICIENTS OF ADJUSTED OVERALL FACILITY RATES OF RETURN AND FACILITY CHARACTERISTICS FOR PROPRIETARY FACILITIES, BY STATE

Facility Characteristics	Colorado	Georgia	New York	Washington
Number of Beds	.006	.042	.141**	.167**
Occupancy Rate	.111*	.379**	.048	-.032
Debt to Asset Ratio	-.253**	-.141**	-.310**	-.136**
Private Patient Days to Total Patient Days Ratio	---	-.095*	.342**	.162**
Incorporation of Nursing Home Dummy Variable	-.207**	.129**	-.134**	-.146**
Facility Ownership Status Dummy Variable	-.023	.034	-.095	-.117**

*Significant at .10 level.
**Significant at .05 level.

of return in all states except Georgia where a positive relationship was exhibited. This finding confirmed the evidence of this relationship indicated in Table III-7 where average rates of corporate and noncorporate groups were compared. In the analysis underlying Table III-7, there was no control over the influence of other facility characteristics. The only significant relationship observed there was in Colorado where, consistent with this coefficient for incorporated facilities, the noncorporate group made relatively higher rates of return.

Why the corporation type of ownership of nursing homes was associated with lower rates of return in three states and not so in the fourth state is not clear. In Georgia where the incorporated facilities were, on average, associated with higher rates of return than proprietorships or partnerships, the proportion of corporate facilities among all facilities was larger than in any other state (Table III-7). It is paradoxical that in Colorado and Washington large proportions of proprietary facilities were incorporated yet, on average, they received lower rates of return than the proprietorships and partnerships. Neither economic nor business theory provides any explanation of why rates of return on capital should be sensitive to the type of ownership _per se_. Productivity and returns should not be influenced by the form of business organization. The fact that these data show higher rates of return for noncorporate business forms may be a reflection of not so obvious factors at play which have not been accounted for. We have no explanations to offer in addition to those mentioned above.

Higher rates of return were associated with facilities that served relatively larger proportions of private patients in the states of New York and Washington. Somewhat less significantly, the reverse relationship was indicated in Georgia.[22] The evidence in New York and Washington was consistent with the industry claims that nursing homes receive higher returns from serving private patients than they received from serving public patients. Evidence from three of the four states suggested that the difference in returns varied from state to state but was the most pronounced in the State of New York.

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[22] The data on private patient days to total patient days were not available for the State of Colorado and, therefore, the variable could not be included in the analysis of rates of return of nursing homes in Colorado.

The size of facilities among proprietary nursing homes was also significantly and positively related to the rates of return in New York and Washington when other characteristics of the facilities were controlled for. A similar result was implied for proprietary facilities in only New York by the difference in the groupwide overall rate of return and the average adjusted overall rate of return results presented in Table III-5, but that result was obtained without controlling for other characteristics of the facilities.[23]

A significant relationship between occupancy rates and adjusted overall rates of return was observed only in the states of Colorado and Georgia. Higher occupancy rates were associated with higher returns. Washington was the only state in which a significant association was observed between whether nursing homes owned their facilities or not and the rates of return. Nursing homes that rented their facilities were associated with higher rates of return consistent with our earlier discussion of data in Table III-8.

These results show that there was considerable uniformity in the observed associations between facility characteristics and rates of return across states. There were, however, some differences across states. An important question is what causes the differential rates of return to be different for various groups of nursing homes within and across states. That question could not be fully addressed because we have examined rates of return in only four states. The small number of states in the study did not allow adequate degrees of freedom or variation in variables of interest to allow a systematic examination of what causes the variation in the rates of return across states or groups of nursing homes.

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[23] This result in Washington is consistent with staffing patterns that have been required in connection with nursing home licensing. The number of licensed nursing personnel required was determined by facility, such that the larger the facility, the lower was the cost of this staffing requirement in relation to the bed capacity of the facility. New York also had required nursing staffing levels over some of this period that were related to the care level of patients. Larger facilities may have had advantages in this regard because the larger the facility and number of patients, the more likely that efficient staffing patterns could be adopted given a mix of patients requiring different levels of care.

C. Rates of Return, Growth, and Reimbursement Policies

We have examined the relationships between rates of return, growth, and reimbursement policies in Colorado, Georgia, New York, and Washington. Although there were a few differences in average rates of return for different groups of nursing homes across states there was little evidence to connect either growth rates or reimbursement policies with the variations in rates of return.

Among the four states, the nursing home industry grew most rapidly in Washington between 1969 and 1973. This fact was consistent with an observed higher industrywide rate of return in Washington. At the same time the rate of growth of the nursing home industry in Georgia was almost as great as in Washington (Table I-4), yet the rate of return was substantially lower in Georgia (Table III-4).

Similarly, the evidence suggested that differences in reimbursement policies of states had little influence on the rates of return. The only state with a flat rate reimbursement system, and one dependent upon group and patient care specific rates over most of the study period (Table II-3) was Washington, also the state with a significantly higher industrywide rate of return than the other three states. However, the higher rate of return in Washington appeared to be related specifically to the relatively higher rates of return for nonprofit facilities. There were no differences in rates of return across states for the proprietary groups which related in any way with the type of reimbursement policy. Exactly why a flat rate system should increase returns for nonproprietary facilities and not the for-profit organizations in Washington was unclear. The relatively higher industrywide rate of return in Washington for nonprofits relative to those in other states may reflect "profitability" from a much higher ratio of private to public patients than in other states (Table B-8), a factor found to be associated with rates of return for proprietary facilities (Table III-10).

Other possible relationships between rates of return and elements of reimbursement or regulatory policies were evident. Two were discussed above. The much higher rate of return for the nursing homes which rent facilities than those homes which own the facilities in Washington was argued to be the result of a peculiar reimbursement arrangement between the two groups of nursing homes. There was also the potential effect in both New York and Washington that minimum staffing regulations had produced economies of scale in nursing home operations, and accordingly, higher rates of return for large relative to small facilities in these two states, a difference not found in the other two states. Finally, the higher industrywide rates of return for proprietary facilities in New York relative to those in other states (Table III-5) may be related to restrictions on entry. Restrictions on multifacility corporations and certificate of need legislation may have created cartel-like circumstances leading to the higher rates of return for proprietary facilities in New York.

The nature of the above findings allow no generalization concerning the relationship of reimbursement or regulatory policy and rates of return across the four states. Although a few isolated implications were plausible on the relationship between reimbursement policy elements and the rates of return and growth, the analysis of a four state sample will provide no more definitive analyses and results.

V. SUMMARY OF FINDINGS, CONCLUSIONS, AND POLICY IMPLICATIONS

A. Summary of Findings

The examination of cost reports submitted to state Medicaid agencies for nearly 1000 nursing homes in four states over the years 1971-75 indicated a significant amount of uniformity in rates of return across groups of nursing homes within and across states. There was considerable variation in individual nursing home rates but average rates, in most cases, were not found to be significantly different across states. In particular, we examined for differences in rates of return along three dimensions: (i) how did the rates vary when alternative adjustments were applied to rates, (ii) how did the rates vary across groups of nursing homes, and (iii) how did the rates vary across states. The findings along each of these three dimensions are summarized below before the conclusions and policy implications are discussed.

1. Variation in Rates of Return Due to Alternative Adjustments

We found that:

- Rate of return on equity is a very volatile measure and exhibits extreme variation across individual nursing homes suggesting that it might not be a good proxy of the real rates of return.
- The use of total assets instead of equity as a rate base generated rates that could be argued on both theoretical and empirical grounds to better approximate real rates of return.
- Adjusting the book overall rate of return, i.e., rate of return on total assets, for depreciation and inflation could be argued to improve further the approximation of real rates of return.
- On average, the proposed adjustment for depreciation resulted in increasing the book value of overall rates of return and the proposed adjustment for inflation resulted in decreasing the book value of overall rates of return.

Our examination of rates of return suggested that the volatility and dispersion of rates were reduced by use of total assets rather than equity as a rate base. Moreover, theoretical and empirical considerations indicated that book values of overall rates of return can be improved by adjusting for depreciation and inflation to reflect more closely the real rates of return being made in the industry.

2. Variation in Rates of Return Across Nursing Home Groups

We found that:

- Rates of return in proprietary nursing homes are, on average, over 50 percent higher than nonproprietary nursing homes.

- There is a large variation in the rates of return across individual nursing homes in nonproprietary nursing homes with significant proportions of nursing homes showing losses.

- Average individual facility rates and groupwide rates were about the same for both proprietary and nonproprietary facilities individually. The groupwide rates were significantly lower than the average individual facility rates for all facilities, a reflection of low rates and larger size associated with nonproprietary facilities.

- There was evidence to suggest that sole proprietorships and partnerships were associated with somewhat higher rates of return than incorporated facilities.

- In general, there was no difference in rates of return of those nursing homes that owned their facilities and those that leased their facilities.

The findings suggested that the differences in rates of return across individual nursing homes were not a function of any single characteristic of nursing homes. Variation in rates across nursing homes can only be understood by developing and testing a model which identifies all the factors which simultaneously affect the rates of return of individual nursing homes. Such an examination was beyond the scope of this project. However, the results of the examination of partial correlation coefficients provided some preliminary evidence that such an approach could be fruitful. Significant partial association between rates of return and nursing home characteristics were indicated which were not shown when the charateristic was individually examined.

3. Variation in Rates of Return Across States

We found that:

- Industrywide rates were higher in the State of Washington than other states. It was a reflection of the relatively higher rates of return being made in the State of Washington by nonproprietary facilities compared to other states. No difference in the rates of return of proprietary facilities was observed across states.

- Proprietary facilities in New York made higher rates of return than similar facilities in other states.
- Sole proprietorships and partnerships in general were associated with lower rates of return in Georgia compared to other states.
- There was a significant difference in the rates of return of nursing homes that owned their facilities and those that leased their facilities in Washington although this most likely was a unique result of the reimbursement system in that state.

There were few differences in average rates of return of different groups of nursing homes across states. This finding pointed out that differences in reimbursement policies of states have little influence on the rates of return. This evidence was consistent with the findings in Part II where no significant association between elements of reimbursement policies and growth, as a proxy for profitability, were obtained.

B. Conclusions and Policy Implications

There were several conclusions with policy implications which resulted from the estimation of rates of return in the four states. We set forth our conclusions with only brief review of the arguments and data to support them.

1. There are strong reasons to reimburse for total assets as a whole, rather than to provide separate allowances for payments for depreciation and for the costs of both debt and equity capital.

In the first place, separating out interest payments on debt and marking them as "pass through" payments eliminates incentives for nursing home entrepreneurs to be efficient in borrowing and in using borrowed capital. Administratively, if assets are reimbursed as a whole, the reimbursement system would also be simpler, reduce extensive regulations over arms-length transactions, and over fixed costs. Equity capital separate from debt capital is, furthermore, an illusive and volatile rate base relative to total assets, both because of its smaller size and because its value is far more easily manipulated by owners than the value of total assets. Payments to total assets are thus more likely to approximate real rates of return than computations for equity capital alone. Finally, the data from these four states show no relationship between reimbursement policy elements setting payments for equity capital and the rates of growth in bed capacity. We conclude, therefore, that for each facility, a single rate of return or rent, established for all nursing home assets will allow a more effective mechanism for controlling growth and for the efficient functioning of a state reimbursement system.

2. The accounting records on total assets should be adjusted in order to approximate real rates of return rather than to rely entirely on unadjusted book rates of return in the reimbursement of capital resources.

Adjustments both for the consequences of conventional accounting practices and for inflation are required to reduce the divergence between book rates of return and the real rates of return. If reimbursement authorities are to affect investment decisions and control the rate of growth of the industry, payments to capital resources must be made to approximate the real rate of return. Investment decisions and the efficient use of capital resources are based on real rates of return, not book rates of return.

Real depreciation is generally less than accounting depreciation which is encouraged by laws which provide incentives for depreciating assets over periods of time much shorter than the real productive life of most assets. The use of zero depreciation reduces the divergence between book and real rates of return. Further increases in asset prices from inflation are also not reflected in the books of the firm, and lead to book rates of return higher than real rates of return. Adjusting asset values for inflation will reduce book rates of return and bring them more in line with the real rates of return. We recommend that reimbursement authorities would be well advised to adjust total assets for inflation and for the effects of traditional accounting practices and to reimburse capital resources as nearly as possible on the basis of the real prices of capital.

3. Reimbursement systems should recognize that nonprofit nursing homes behave differently in the use of capital resources than do proprietary nursing homes.

The evidence was clear that nonprofit facilities obtained a lower rate of return on capital than was received by proprietary nursing homes. At the same time, our findings indicated a much higher capital investment per bed in the nonprofit facilities. Both findings have implications for reimbursement policy. What would otherwise be recorded as net income in proprietary facilities may well be dissipated in operating expense areas which fit the particular philosophy of the nonprofit institution. Overcapitalization is frequently a similar consequence of nonprofit organization, and can lead to lower rates of return by expanding the capital base. The reimbursement authorities, under these circumstances, must be alert to probable higher per diem costs of care in nonprofit than proprietary nursing homes, and whether the larger investment of resources can be justified on the basis of quality of care is a question we have not analyzed in this study.

4. More extensive review and auditing under statewide uniform cost and data reporting systems would improve comparability of data across facilities and states, and more likely assure equity in payments across nursing homes.

There were substantial difficulties in adjusting facility reports from year to year, and across states, in order to maintain an acceptable consistency and comparability of data for this study. Adoption of a uniform cost and data reporting system within a state reduces the probabilities of spurious differences in line item costs, rates of return on capital resources, and other data across nursing homes. Non-arms-length transactions between some corporate facilities and parent corporations may over- or undercharge in relation to *bona fide* market transactions, and accordingly alter reported net income and returns to capital for corporation owned facilities. In addition, one factor, which may account for the higher rates of return for proprietorships and partnerships relative to corporations, is a misallocation of entrepreneurial wages _vis a vis_ returns to owner capital. In both of these illustrations, comparability of data reported under a uniform reporting system, where reports are audited, will increase the probabilities of more accurate comparisons across facilities, and accordingly more equitable payments across nursing homes.

5. _Further examination of why rates of return vary among individual facilities is required before reimbursement policies can be used effectively to influence rates of return and growth in the nursing home industry._

An analysis is called for involving a model or models that can describe simultaneously the effects of different variables on the rates of return of nursing homes. Variations in rates of return across facilities in these four states were substantial and could not be explained by examining single characteristics of nursing homes. Further, the data from these four states failed to confirm any consistent relationships among rates of return, growth and reimbursement system. However, the significant partial correlations between some facility characteristics and rates of return which were not shown when the characteristic was examined individually indicated that the development and testing of a multivariate model of the relationships between rates of return, growth, reimbursement policies and facility characteristics could prove fruitful.

PART IV

RISKINESS OF INVESTMENT AND RATES OF RETURN IN THE NURSING HOME INDUSTRY: A RISK STUDY

RISKINESS OF INVESTMENT AND RATES OF RETURN IN THE NURSING HOME INDUSTRY: A RISK STUDY

I. INTRODUCTION

Cost-related reimbursement includes payments for operating costs and the opportunity cost of capital. Unlike operating costs, the opportunity cost of capital cannot be obtained from accounting records. Payments for the opportunity cost of capital are arbitrarily specified in most reimbursement systems. It is therefore not surprising that the resultant rate of return on investment in the nursing home industry has been a source of controversy. The reasonableness of the rate of return in the industry has been challenged by owners of nursing homes in most states. An important element of this controversy is the level of risk associated with investment in the nursing home industry. It is alleged that payments for capital are not commensurate with the riskiness of the industry.

In this portion of the study we attempt to assess the risk associated with investment in the nursing home industry and to determine whether the level of risk varies with characteristics of nursing facilities such as forms of ownership, size, occupancy rates, and debt/equity ratios. The purpose is to confirm whether investment in the nursing home industry is riskier than other investments in general. Only if it is riskier is there a reason to reimburse over and above the market rate of return.[1] It is also possible that the nursing home industry might be less risky than the market. In this case, reimbursement at a rate lower than the market rate of return would be appropriate.[2]

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[1] We use the market rate of return in this discussion to mean the average rate of return that would be obtained from an efficient diversified portfolio of securities listed on a national stock exchange.

[2] What, in fact, may be appropriate will indeed depend on the policy objectives. If the reimbursement authorities want the industry to expand or contract, then they must pay that rate of return which will bring about the desired result. In this case, the question of relative riskiness is irrelevant because the reimbursement rate, and rate of return, must be determined not by the cost of capital but by whatever is necessary to achieve the desired goal of the reimbursement authority. However, in this risk study, we assume that the reimbursement authorities seek to remain neutral with respect to market forces. This assumption is more precisely described in the section on Research Strategy.

A. The Comparable Earnings Standard

The question of risk in regulated industries has received considerable attention. The Supreme Court in the Hope decision clearly laid down that the regulated rate of return should allow for a normal rate of return after allowances for risk. Moreover, the comparable earnings standard which evolved out of the Hope decision concluded that "the return to the equity owners should be commensurate with returns on investments in other enterprises having corresponding risk" [30, P. 603]. The comparable earnings standard is useful only to the extent that there is agreement on an industry of comparable risk and the average earnings of that industry can be determined. Even though much of the discussion of reimbursement for capital and risk in the nursing home industry has revolved around the comparable earnings standard, no attempt has been made either to use explicitly such a process in the existing state reimbursement policies or to identify systematically industries of comparable risk. One problem with this approach is that all industries have enough unique characteristics that achieving a consensus on an industry of comparable risk to the nursing home industry is impossible, especially when the reimbursement authorities are intent on minimizing payments and the industry on maximizing profits. Thus, in the absence of a simple way to measure the relative riskiness of investment in the nursing home industry, reimbursement for risk has not been explicitly accounted for in the state reimbursement systems.

B. A Risk Model

Our procedure by which to assess the level of risk associated with the nursing home industry was based on a "Capital Asset Pricing" model (CAP). This model was derived from the theory of investment behavior and used stock market price information for publicly held corporations to assess the relative level of risk of these corporations. The usefulness of the risk measure estimated in this manner was limited, because the nursing home industry consists predominantly of proprietorships, partnerships and privately held corporations. Riskiness associated with these types of firms might differ from the riskiness of investment in publicly held nursing home corporations. Accordingly, we determined the relationship between the estimated relative risk levels and the financial characteristics of publicly held nursing home corporations, and used these relationships in turn to predict the risk associated with investment in other forms of nursing home ownership. This approach assumes (1) that the determinants of risk are reflected in financial measures such as liquidity, size and growth of assets and earnings, and (2) that the relationship between the financial measures and risk is independent of the form of nursing home ownership.

A more detailed description of the CAP model and the empirical specification for the analysis performed is contained in the next section on research strategy. In that section we also discuss briefly the relevance of the concept of risk underlying the CAP model to the problem of reimbursement. The research strategy section is followed by a discussion of the data used in the analysis. In Section IV we present the results of our analysis. In the final section we briefly examine the implications of the findings for the purposes of formulating reimbursement policies.

II. RESEARCH STRATEGY

We first discuss the measure of risk relevant for purposes of reimbursing for nursing home services which is background for the description of the capital asset pricing model. In the third subsection of the discussion on research strategy, we set forth the methods and procedure for estimating risk in the nontraded sector of the nursing home industry.

A. Risk and Reimbursement Systems

In regulated industries, reimbursement systems are an instrument by which the government influences the growth of an industry or of various sectors within the industry. Thus, a meaningful way to evaluate the efficiency or appropriateness of a reimbursement policy is to do so within the framework of specified policy objectives. For purposes of a general approach towards the reimbursement for risk, we consider only a neutral reimbursement policy. By a neutral reimbursement policy we mean a policy that does not influence the natural forces of the marketplace.[3] That is, the equilibrium prices and quantities of the "product" in the nursing home industry resulting from government reimbursement on behalf of public patients are no different than the prices and quantities that would have resulted if the public patients were to purchase the nursing home services in a competitive market. Under such a policy the reimbursement for the cost of equity capital would include a premium in addition to the market rate of return on investments in a diversified portfolio of publicly traded securities taken as a whole.

Assessing risk associated with an investment in a firm is not a simple exercise. It is only in the last decade that considerable progress has been made in the area of estimating risk. We adopted the CAP model to assess the riskiness of investment in the nursing home industry. This model was selected because of its sound theoretical foundation and its amenability to empirical determination.

1. The Concept of Risk

Underlying the capital asset pricing model is a concept of risk. It is important to the formulation of reimbursement policy that this concept is understood clearly.

Risk is associated with uncertainty of earnings. Uncertainty of earnings can be thought of as the variability of some income stream around its average value. To some extent, the variability of expected returns can be dampened by combining different investments into a single portfolio, i.e., by "diversifying." What matters to an investor is the variability of return to his overall portfolio, not to any single investment within it.[4] Therefore, the riskiness attached to any particular stock in the portfolio will include not only the variability of return to that particular investment, but also the change in the variability of income of the entire portfolio when it is expanded to include this stock. Thus, from the point of view of the investor, the riskiness attached to investment in activity X is a function of the *covariance* of the income stream from activity X with income streams of other activities in the portfolio and not the variance of the income stream of activity X. This implies that the expected returns are not influenced by the total riskiness of activity X but only a component of the total risk, referred to as systematic risk.[5] The total variability of return can therefore be thought of as composed of a diversifiable, unsystematic portion and an undiversifiable, systematic portion (perhaps due to underlying variability in the real economy).

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[3] We neglect the possibility of other regulatory constraints, such as minimum quality standards.

[4] See Markowitz [57] and Sharpe [101]. Some believe that adequate evidence to support the Markowitz and Sharpe contention has not yet been produced [77].

It was a contribution of the theory of finance to show that investments earn premium rates of return only as a function of their systematic risk, and not as a function of their total (systematic + unsystematic) risk. Thus it is only the *systematic* risk attached to an investment which is relevant for reimbursement policy. If reimbursement is based on total risk and not on systematic risk, then the neutrality of reimbursement policy (as defined above) will not be maintained.

2. Risk and the Nursing Home Industry

The relevance of the above discussion to nursing homes might be questioned because much of the industry is composed of proprietorships, partnerships, and closed family corporations. Is a theory which measures riskiness by an investment's contribution to an efficient portfolio applicable to cases where the single investment constitutes the portfolio? The answer is yes.

Although owners of "single asset portfolios"--e.g., those holding *all* of their assets in the nursing home industry--may not have achieved the benefits of diversification, these investors must compete in a market in which other investors have diversified. Owners choosing to hold assets in a single activity will therefore receive only the risk premium associated with the systematic risk of that activity, i.e., the covariance between the earnings of that activity and the efficient portfolio.

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[5] A unique value of systematic risk of activity X is derived by considering the variance of earnings of an efficient portfolio, e.g., one which minimizes the variance for any expected return. There can exist many efficient portfolios, but the rates of return are perfectly correlated, hence the covariance of the earnings of activity X with any such portfolio would be identical [100].

In more specific terms, capital invested in sole proprietorships, for example, will not earn a higher rate of return than capital invested in corporate enterprises simply because the capital is in a proprietorship. It is the nursing home industry whose risk commands a premium, and not decisions of individual nursing home owners on the form of business organization.

3. Models for Measuring Risk

Several models for measuring risk have received considerable attention in the finance and utility regulation literature. Earlier models were developed on a pragmatic basis or, even when based on individual investor behavior, did not provide a systematic explanation of the behavior of capital markets. A complete theory of how risk affects expected rates of return was only achieved when the CAP model was developed. It extended earlier models of investor behavior to provide a market theory of asset prices under conditions of risk.[6]

The CAP model provides the key to the question of risk and reimbursement. It is a formal theory of the relationship between that component of total risk, which is systematically related to expected rates of return associated with specific investments. Moreover, the CAP model can be estimated from historical data. Accordingly, in the next two subsections we describe the empirical implementation of the CAP model to the nursing home industry. Throughout this analysis we examine the systematic risk associated with investment in the nursing home industry.

In the next subsection we consider first the theoretical aspects of the CAP model and then provide an empirical specification used in the analyses in this study.

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[6] For earlier models of investor behavior see Gordon and Gangolli [37], Tobin [112], and Hicks [42]. For development of the CAP model see Sharpe [100], Lintner [53, 54], and Markowitz [57] and Mossin [75].

B. Capital Asset Pricing Model

1. Theory Underlying the Model

The CAP model is based on a market equilibrium theory of stock prices. Investors in corporate securities are characterized (as in traditional portfolio theory) as individuals interested in maximum expected return, which depends on anticipated stock prices plus expected dividends, for a given level of risk.

The CAP model assumes that investors select their portfolios on the basis of the mean and variance of the rate of return, where the expected return to a single security is expressed as the mean of previous returns. The model further assumes that investors (1) are utility maximizing; (2) can lend or borrow at the market risk-free rate of return; and (3) are price-takers. In addition, in its simple form, it assumes that there are no taxes or transaction costs, and that all assets are in fixed supply and marketable.

Utility maximizing investors form their portfolios by combining securities with low covariance of returns in order to minimize portfolio variability. Thus an individual security's contribution to portfolio risk is measured by its average covariance with all other portfolio securities and not particularly by its variability. Diversification thus enables investors to avoid all but the risk resulting from swings in overall market activity. There are many portfolios which may be formed from the multitude of securities available to the investor; the model suggests that individual investors will choose that portfolio which maximizes the utility of each investor.

Several assumptions concerning individual utility functions are needed by the CAP model in order to describe the market's assessment of the value of individual securities. The first condition imposed is that investors are risk-averse; the second is that investor expectations with respect to estimates of risk and return are homogeneous. Under these conditions asset prices will adjust until a set of prices is attained at which every asset enters at least one portfolio considered to be optimal by investors.

The CAP model also observes that investors are not constrained to hold risky assets. They may choose to hold cash, insured savings balances, or government guaranteed obligations, such as Treasury Bills. These assets yield some return to their holders at negligible risk, since there is little possibility of earnings variability.

It is argued in the CAP model that, in equilibrium, several diversified efficient combinations of risky assets exist in capital markets and the expected rates of return of these combinations are perfectly correlated. In particular, the CAP model states that, at equilibrium, asset prices will be determined such that the following condition holds:

$$\text{IV-(1)} \qquad E(R_i) = R_F + \beta_i \cdot [E(R_m) - R_F]$$

and

$$\beta_i = \frac{\sigma(R_i, R_m)}{\sigma^2(R_m)}$$

where

$E(R_i)$ = expected return on asset i;

R_F = rate of return on riskless asset;

$E(R_m)$ = expected return on an efficient market portfolio;

$\sigma(R_i, R_m)$ = covariance of asset i's returns with the market portfolio returns;

$\sigma^2(R_m)$ = variance of the return on the efficient market portfolio;

β_i = beta value of asset i, the systematic risk coefficient.

The model therefore exhibits a linear relationship between the systematic risk coefficient--beta--and the expected return on the asset such that the greater the risk the higher the return. It should be recognized that beta is a measure of relative riskiness; it measures the riskiness of an asset relative to the riskiness of the efficient market portfolio. This systematic risk measures the uncertainty of earnings in terms of its covariance with the market portfolio, and not its variance. Since we are interested in measuring the relative level of that component of risk which determines prices and expected rates of return, beta is the risk measure that should be estimated.

In general, the beta coefficient has two principal properties. First, the higher the beta value, the greater the riskiness associated with an asset. Second, a beta coefficient value equal to one implies the same level of riskiness in a single asset as the riskiness of an efficient market portfolio.

In summary, an asset with a high variation in earnings need not be risky in an economic sense, if it has a low covariance with the market portfolio. The unsystematic risk of such an asset may be high, but it can be mitigated through diversification. It is the systematic component of risk, which results from the swings of economic activity, that gets reflected in the prices and the expected rate of return of a specific asset or investment.

2. The Empirical Specification of the CAP Model

Empirical assessments of betas were performed using least squares regressions of the following form:

$$\text{IV-(2)} \qquad R_{it} - R_{Ft} = \alpha + \beta_i(R_{Mt} - R_{Ft}) + \varepsilon_{it}$$

where

$$R_{it} = \frac{P_{it+1} - P_{it} + D_{it} + C_{it}}{P_{it}}$$

$$R_{Mt} = \frac{P_{Mt+1} - P_{Mt}}{P_{Mt}}$$

$$R_{Ft} = \frac{MV_{Ft}}{P_{Ft-1}}$$

R_{it} = ex post returns on stocks of the i^{th} firm;

R_{Mt} = ex post returns on a market portfolio;

P_{it} = stock prices of the i^{th} firm at the close of period t;

P_{Mt} = value of the market portfolios at the close of period t;

P_{Ft} = purchase price of a risk-free asset at the close of period t;

MV_{Ft} = maturity value of a risk-free asset at the close of period t;

D_{it} = cash dividend declared on common stock i during period t;

C_{it} = adjustments for common stock dividends and common stock splits during period t;

ε_{it} = disturbance term.

The data on these variables were collected from several sources and are described in Section III. Separate beta estimates were obtained for publicly held nursing home corporations. Since publicly held nursing home corporations represent less than five percent of the number of homes in the industry there remained the problem of obtaining beta estimates for other more common forms of ownership arrangements in the nursing home industry. We consider this issue next.

C. Estimating Risk in the Nontraded Sector of the Nursing Home Industry

It is reasonable to argue that the risk structure of the publicly held corporate sector of the nursing home industry does not necessarily reflect the risk associated with the nontraded sector of the industry. The factors influencing the inherent risk in a nursing home might vary with different forms of nursing home ownership. The capital asset pricing theory provided a measure of riskiness which was based on pricing data in capital markets. Since these pricing data were unavailable for most firms in the nursing home industry other types of information were required to estimate beta for the nontraded sector of the industry. Other data in the form of accounting financial ratios, such as interest to total revenue, profit margin or growth rate in earnings, were found to correlate with the riskiness of an asset, and were also available in both the traded and nontraded sectors of this industry. Accordingly, the financial ratios were used to estimate predicting equations for beta using the publicly traded sector data. The coefficient estimates of the financial ratios were then used to predict betas for nursing homes in the nontraded sector.

We first describe the determination of the predicting equation, and then set forth the procedure for predicting betas in the nontraded nursing home sector.

1. The Predicting Equation

The evidence is rather substantial that various accounting measures, such as financial ratios of items from the income and expense statement or the balance sheet, are correlated with systematic risk. Statistically significant relationships have been found between market determined risk measures and the risk measures derived from accounting data by Beaver, et al. [15], Gonedes [36], Bildersee [16], and Rosenberg and Guy [95]. In addition, Beaver [14] showed that various accounting ratios were good predictors of failure of firms. Horrigan [44] evaluated the predictive power of financial ratios in regard to corporate bond rating. The probability of loan default appears to be directly related to the variability of earnings. Finally, a primary benefit of financial accounting, as discussed in the accounting literature generally, lies in the use of financial data as means to evaluate both the performance and credit worthiness of a firm but also the attractiveness of the firm as an investment opportunity. These considerations led to the examination of financial ratios and risk, and to the conclusion that such accounting data would be associated with the systematic risk of a firm.[7]

We have used the established relationship between risk and accounting data as a basis to estimate a prediting equation by regressing the betas estimated for publicly traded nursing homes (the measures of systematic risk) on a set of accounting measures commonly associated with risk. Specifically, an equation of the following form was estimated:

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[7] It has been suggested that accounting measures incorporate total risk, i.e., total variability of return. Beaver, et al. [15] argue that the systematic and unsystematic components of total risk are positively correlated. Therefore, it is reasonable to assume an association between accounting measures and systematic risk.

IV-(3) $$\beta_i = \alpha_0 + \alpha_1 \text{ ACCMSR}_{1i} + \ldots + \alpha_n \text{ ACCMSR}_{ni} + \varepsilon_i$$

where

β_i = estimated beta for the i^{th} firm;

$\text{ACCMSR}_1 \ldots \text{ACCMSR}_n$ = a set of accounting measures associated with the riskiness of a firm;

α's = regression coefficients.

The evidence in the literature on the correlation of accounting measures and risk does not provide the solution to the problem of selecting the appropriate set of accounting measures for purposes of estimating the above equation for the nursing home industry. In the literature a large number of accounting measures have been found related to risk.[8] It was neither possible nor advisable to include all these as independent variables in our analysis. The accounting measures for the predicting equations were selected in the following way. First, a list of accounting measures was prepared based on the relevant important relationships suggested in previous studies. Seven broadly defined classes of accounting measures such as liquidity, growth, leverage, etc. were identified. In each class several alternative measures were defined, once again based on definitions commonly employed in studies using accounting data. The accounting measures under each of the seven classes are summarized in Table IV-1. The precise definition of each variable is contained in Table C-8 and other information in Appendix C.

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[8] The studies cited above, for example, did not identify the same set of financial ratios as the important accounting measures. The result is not surprising, and appears to stem from the nature of accounting data. There is considerable variation in the accounting practices of firms. Most of these studies also used a heterogeneous mix of companies; specifically, companies from different industries. Bildersee [16] argues that the information content and importance of a given accounting number differs across industries. Fortunately, this was not a problem in our analysis which analyzes data only from nursing home firms.

TABLE IV-1

ACCOUNTING RISK MEASURES

I. Liquidity Measures

   1. Current Assets/Current Liabilities
   2. Cash/Current Liabilities
   3. Cash/Total Assets

II. Leverage Measures

   1. Long Term Liabilities/Total Assets
   2. Total Liabilities/Total Assets
   3. Interest Expense/Total Revenue

III. Size Measures

   1. Average Value of Total Assets
   2. Average Logarithmic Value of Total Assets

IV. Growth Measures

   1. Average Logarithmic Value of the Ratio of Total Assets at the End of the Period to Total Assets at the Beginning of the Period
   2. Average Annual Change in Net Earnings
   3. Average Ratio of Net Earnings in Year t to Net Earnings in Year t-1

V. Earnings Variability Measure

   1. Coefficient of Variation of Net Earnings

VI. Income Ratios

   1. Net Earnings/Total Assets
   2. Net Earnings/Equity
   3. Adjusted Net Earnings/Total Assets
   4. Net Earnings/Total Revenues (Profit Margin)

VII. Capital Turnover Ratios

   1. Total Revenue/Fixed Assets
   2. Total Revenue/Total Assets

It was not our contention that the list of financial variables would be exhaustive, but rather that it contain the variables shown to be important in predicting risk. There are financial ratios and data excluded from our list of potential variables. The exceptions are primarily the class of accounting measures which depend upon dividends, stock prices, or share turnovers. We did not include these measures because the predicting equation was subsequently to be used to predict betas for the nontraded sector of the nursing home industry, and of course, stock price information does not exist for this group of nursing homes.

The expected association of each class of financial ratio variables to systematic risk is briefly discussed below.

(i) Liquidity. It can be argued that liquid or current assets are less risky because of the relative ease associated with converting them into cash.[9] There is small variation in the value of the current assets in the market because they are relatively simple to evaluate. In general it can therefore be expected that the greater the liquidity, the lower the risk.

(ii) Leverage. Debt has usually been argued to increase the volatility of earning streams [70]. Higher debt to asset ratios reduce the ability of nursing home owners to weather the downswings of economic activities. An alternative measure of the firm's leverage is the ratio of interest payments to revenues. In either case, a priori, higher leverage ratios are likely to be associated with higher systematic risk.

(iii) Asset Size. The relationship between asset size and variability of returns is not linear. The variability of aggregated returns also should increase less rapidly than the size of the firm's assets. It, therefore follows that large firms are less risky both in the sense of avoiding bankruptcy and in terms of earnings variability [14, 4].

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[9] Cash, if one ignores the risk associated with potential loss of purchasing power, can be considered a risk-free asset.

(iv) Growth. Growth measures indicate management's confidence in its expectation about the future. This confidence is reflected in retention of earnings and continued investment. Beaver, *et al.* [15] have argued that opportunities for excessive earnings are not likely to persist in competitive markets since earnings are subject to the entry of new firms. Changing economic conditions and increasing regulations of the nursing home industry also limit earnings. Consequently, the potential earning stream of rapidly growing firms with the opportunity for excessive earnings is more uncertain than the earnings stream of relatively stable firms. Accordingly, high growth firms are expected to be associated with higher risk. In our analysis growth variables were defined with respect to both assets and earnings.

(v) Variability of Earnings. Firms which exhibit large absolute variations in earnings are likely to regard these as deviations from the prior expectations and management policies are presumably revised under such conditions. The revised expectations themselves may change the permanent output levels of the firm. Although this is a stabilizing process in the long run, it may add to the volatility of earnings in the short run and, therefore, add to risk. This reasoning suggests that higher systematic risk will be associated with companies with large changes in the level of earnings.

(vi) Income Ratios. Relatively higher income for any size of the firm is likely to affect the firm's ability to counter the influences of uncertain events on its earnings. Such firms will be perceived as successful and therefore command superior access to capital markets. These strengths would allow firms with higher income to remain relatively unaffected by economic changes and therefore be associated with lower systematic risk.

(vii) Turnover Ratios. The capital turnover ratios, defined by a ratio of revenues to total or fixed assets, capture the relative size of operating expenses and the fixed costs of the firm. For some normal level of profits firms with higher revenue to asset ratios are the firms which have higher operating costs relative to their fixed costs. Since operating expenses can be altered more readily than fixed costs, firms with higher capital turnover ratios are likely to be less risky. They possess an added control to respond to uncertainty of economic activity.

The selection of exact accounting measures to be used in our analysis was based on their statistical significance and the amount of the variation in the dependent variable explained. The purpose of this part of the analysis was to estimate an equation which would be relatively robust and stable and, therefore, would produce consistent values of betas for the nontraded nursing homes. Maximization of R^2 is desired for predicting equations only to the extent that the independent variables included do not exhibit trivial and weak relationships. Accordingly, two criteria were established by which to select the accounting measures for the predicting equation. First, include only one variable from each class of accounting measures, so that the colinear variables do not enter the equation. Second, select those variables that maximized adjusted R^2.

The above criteria were implemented by running stepwise regressions on sets of accounting measures from the publicly traded nursing home corporations for which we had estimated beta values. The sets of variables included one financial ratio from each of the seven classes. Those variables which exhibited t-values greater than one were retained. This procedure resulted in eliminating accounting measures from three of the above seven classes: asset size, turnover ratios and liquidity. From among the remaining four classes a set of four variables, one from each class, was selected to maximize the adjusted R^2 of the predicting equation estimated. All possible combinations of variables were not examined. It is reasonable to assume, however, that the procedure resulted in a specification that captured the important relationships between accounting measures and systematic risk in the case of the publicly traded firms in the nursing home industry.

The predicting equation that was obtained by the above procedures, and that was used in the analysis, was the following:

$$\text{IV-(4)} \qquad \beta_i = \alpha_0 + \alpha_1 \mathrm{INTREV}_i + \alpha_2 \mathrm{ERNGR}_i + \alpha_3 \mathrm{ERNVAR}_i + \alpha_4 \mathrm{PFTMAR}_i + \varepsilon_i$$

where

β_i = estimated beta of the i^{th} publicly held nursing home firm;

INTREV = interest to revenue ratio;

ERNGR = earnings growth;

ERNVAR = earnings variation;

PFTMAR = profit margin;

α_i's = regression coefficients

ε_i = error term

The results of this equation are discussed in Section IV.B below.

2. Prediction of Betas for Nontraded Nursing Homes

The availability of accounting measures for all nursing homes in the four states included in the State Studies made possible the estimation of betas for the nontraded sector of nursing homes.[10] The coefficient estimates of the predicting equation described above were combined with accounting data in the four states, and betas predicted for the individual nursing homes.

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[10] The estimation of beta values is for the investment in a firm, not a facility or a nursing home. Individual nursing homes for which we obtained accounting data were not always the firm because some firms in each state owned and operated more than one facility. In the absence of data on ownership by firm, we assumed that the financial ratio across facilities in the same firm would not be significantly different because management philosophy and techniques would be similarly reflected in each facility.

The precision of the estimated betas of individual nursing homes in the nontraded sector depended upon the validity of the predicting equation and its coefficient estimates. However, by averaging the predicted beta values of individual nursing homes for a group of facilities to obtain an average beta value, random errors in the predicting equation were likely to cancel out in the averaging. Thus, the resultant average betas of different groups of nursing homes would be more precise estimates of beta, the measure of systematic risk associated with that group of nursing homes, than the predicted values of individual nursing homes. In addition to improving the precision of the risk measure, groups of like facilities may also constitute a more relevant basis for reimbursement policy than does the individual nursing home.

Accordingly, nursing homes in the four states were combined into several different groups and average betas computed for each group to obtain a measure of the relative systematic risk associated with different groups of homes. In particular, the average betas were computed for proprietary nursing homes by state, and within states, by six two-way classifications based on the following variables:

(1) Owner and lessee operated;

Above and below the median values for:

(2) Size of facility by number of beds;

(3) Occupancy rate;

(4) Ratio of private to total patient days;

(5) Ratio of debt to total assets, and

(6) Ratio of equity to debt.

D. Summary of Research Strategy

In summary, the strategy adopted to estimate the relative riskiness of investment in the nursing home industry consisted of four steps. First was the selection of the Capital Asset Pricing Model as the theory for estimating a measure of systematic risk, which is that component of risk relevant to reimbursement policy. In the second step, beta, a measure of relative systematic risk, was estimated for publicly traded nursing home firms using the CAP model. Since the nursing home industry consists largely of nontraded firms for whom beta cannot be estimated using the CAP model we estimated a predicting equation for such firms. Thus, in the third step, the predicting equation related the estimated betas of publicly traded firms to accounting measures associated with risk. In the final step the estimated coefficients of the predicting equation were applied to the accounting measures of the nontraded nursing home firms. Average betas for different groups of nursing homes were then computed.

The results of these analyses are discussed below after a brief description of the data used in this study.

III. DATA

The data used in these analyses can be divided into three sets: (1) data for the CAP model, (2) data on publicly traded nursing home firms for developing the predicting equation, and (3) data on nontraded nursing home firms for using the predicting equation. Each of these data sets is discussed in turn, following a brief description of the universe of publicly traded nursing home firms. Detailed descriptions of all data are contained in Appendix C.

A. Data for the CAP Model

The estimation of the CAP model required (1) stock market data on publicly traded nursing home firms, (2) yield data on risk-free assets, and (3) price data on stock market portfolios. An initial task, however, was to identify those firms to be included in the estimation of the CAP model.

A list of 61 publicly traded nursing home firms were identified from among organizations included on various lists of firms in the health field. The key consideration was determining whether the nursing home activities were a sufficiently large part of the operation of the firm in question to be included in the CAP model estimation. Most firms in the nursing home and health related ares were involved in more than one business activity. Firms which were only marginally involved in nursing home operations were obviously not appropriate for our analysis. Therefore, only those publicly traded nursing home firms whose business in nursing home operations constituted at least 40 percent of the revenues of the firm and revenues from no other single business activity exceeded the nursing home revenues of the firm in the period under study, were included in the study group. For purposes of our analysis the period was fixed to be from 1971 to 1976. Further details on the search for and the identification of publicly traded nursing home firms are found in Appendix C.

1. Market Data on Publicly Traded Nursing Home Firms

Stock prices, dividends and stock split information was required to compute the ex post rates of return on the publicly traded nursing home firms. The market data for estimating the CAP model were found for only 49 firms on the list of 61 identified as publicly traded and primarily in the nursing home area.

The price data were not available for all firms from any single source, and in some cases, more than one source was required for a single firm. Several sources and publications were consulted to obtain the required price data. These sources are described in Appendix C, and include the Wall Street Journal, Commercial and Financial Chronicle, and reports from Standard and Poor's, among others.

Both weekly and monthly data were collected for all firms. In the case of certain firms the stock price data series did not extend over the entire period of 1971 to 1976 because some firms had not been in existence, merged or had gone out of business over that period. Only firms for which we had at least 25 consecutive monthly observations were included in our analysis.

The information on dividends and stock splits was obtained from SEC 10-K forms and "Moody's Dividend Record". These data were used to compute the monthly and weekly rates of return for each firm according to the formula contained in equation IV-(2). The mean and standard deviation of both the monthly price quotations and the monthly rates of return are contained in Table C-5.[11]

2. Price Data on Risk-Free Assets

The 90-day U.S. Treasury Bill was selected as a proxy for the hypothetical risk-free asset to provide the riskless rate of interest to be used in the estimation of the CAP model. We collected two sets of data to compute a series on both weekly and monthly riskless rates. The data were obtained from the "ask discount price" quotes on 90-day Treasury Bills published in the Wall Street Journal for the period from January 1971 to December 1976. Prices were collected for Thursday of every week and for the last day of each month, or, if no trading took place on that day, the first trading day of the next month.

The rate of return on Treasury Bills was computed from the ask discount price in the following manner, which can be used to compute weekly, monthly, quarterly, etc. rates for Treasury Bills.[12]

For any given Treasury Bill,

$$(1)\quad \text{Full Discount Based on Ask Price} = \frac{\text{Ask Discount Price}}{360} \times \text{Number of Days to Maturity}$$

$$(2)\quad \text{Purchase Price of T-Bill} = \$100.00 - \text{Full Discount Based on Ask Price}$$

(3) Risk-Free Rate for some time interval, t:

$$R_{Ft} = \frac{\text{Maturity Value at end of period } t^{13}}{\text{Purchase Price of T-Bill at end of period } t-1}$$

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[11] Only monthly rates are presented because the final beta estimates used in this study were based on monthly price data.

[12] For a detailed description of this method, see [32].

[13] The maturity value at the end of period t is always equal to 100.00 in this formula.

Because the market data for the publicly held corporations were limited to monthly observations, only the monthly rates of return on 90-day Treasury Bills for the period 1971 to 1976 are shown in Table C-6 in Appendix C.

3. Price Data on the Market Portfolio

Monthly and weekly stock price data were collected on the series for the major exchanges including the National Association of Security Dealers' Over-the-Counter Index (NASDAQ - OTC) for the period from January 1971 to December 1976. The OTC index was chosen for use in the CAP model in preference to diversified portfolio indices of other major stock exchanges because the OTC index was composed of the largest number of stocks. Moreover, most of the publicly held nursing homes were included in the OTC index.[14] End of the month values of the OTC index, and other stock market indices are shown in Table C-6. Monthly rates of return were computed from these data.

B. Data for the Predicting Equations

Data for the predicting equations consisted of the financial ratios from accounting records of both the publicly traded firms and from the nursing homes in the nontraded sector.

1. Accounting Data from the Publicly Traded Nursing Home Firms

Data on all accounting measures summarized in Table IV-1 were extracted from SEC 10-K forms for 56 firms for each of the 6 years, 1970-75.[15] SEC 10-K forms were unavailable for 5 firms. The actual raw data collected and the variables used to compute the accounting measures are described in Appendix C, Table C-3. Average values were computed for each of the variables used to generate the accounting measures shown in Table IV-1. The mean and standard deviation of these variables are shown in Table C-4. The average values were used to compute the accounting measures for each firm, which were in turn used in the estimation of the predicting equation. The mean and standard deviation of the accounting measures for the publicly traded nursing homes are shown in Table C-8 in Appendix C.[16]

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[14] It has been shown that estimates of beta derived from the CAP model are independent of the market index used. (Fisher [33], Fama, et al. [29].) Also the theory of the CAP model suggests that several efficient combinations of assets can coexist in the market and that rates of return on these combinations will be perfectly correlated [Sharpe, 100].

[15] It should be noted that the market data used to estimate the betas were for the period from 1971 to 1976 but the accounting measures were derived for the period 1970 to 1975.

2. Accounting Measures for Nontraded Nursing Homes

Data for accounting measures for the nontraded nursing homes were obtained from the financial reports of nursing homes submitted to the Medicaid agencies in the states of Colorado, Georgia, New York and Washington. These reports have been discussed at length in Part III on the State Studies and in Appendix B. The means and standard deviations of several accounting measures of risk for nursing homes in each of the four states are shown in Table C-10. All these measures were derived from annual financial reports for five years from 1971 to 1975. Wherever reports for all years were not available, averages of the available data were used.

C. Summary of Data

The number of publicly traded nursing homes for which betas were computed and for which accounting measures were used in the predicting equation was 37. Although there were 49 firms with usable stock market data and 56 firms for which we obtained SEC 10-K forms with the necessary accounting data, there were only 46 on which both sets of data were available. We chose, however, to eliminate nine additional firms, and base our results on the data from 37. This decision was based on two considerations. First, several nursing home firms, even though publicly traded, were "thinly held" corporations, i.e., they had relatively few stockholders and were not actively traded in the market. Consequently, inactive trading among thinly held firms resulted in stationary ask and bid prices over prolonged periods. It might be expected that price changes in such cases would be triggered only in response to actual bids for purchase of stock rather than the expectation of purchase bids. The implication is that the observed prices do not reflect the real values that would have existed if the stocks were actually to have changed hands.

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[16] In a few cases SEC 10-K forms were not available for all the years for which market data on the firm were available. In this case only the available data were used to compute the average accounting measures.

Second, another characteristic of stock prices of nursing home firms which raised some questions was the relatively low absolute prices of the shares of some firms. Price changes in low value shares lead to very large variation in the estimates of the rate of return. Ask and bid prices of stocks are reported only in steps of 12.5 cents. If the stock price of a nursing home firm in one period is 50 cents and the value changes by 5 percent, the change will not be registered in the ask and bid price series. The change in price is too small to report. Only a change in price larger than 6.75 cents would be registered in the reported series. Thus changes in value of 13 percent could go unobserved or be overreported by about the same level in the reported price series.

In the case of inactively traded firms, we adopted the criterion that, if the ratio of the number of months during which no price change was made to the total number of months for which price data were available exceeded .4, the firm was deemed to be excessivly inactive. This ratio is a crude measure of the extent of trading activity of the firm's stock. However, seven firms were excluded because they failed to meet this criterion.[17] Two additional firms were excluded because of low stock values over the period of the study. In this case, we used an average stock price value of one dollar as the cut off point. The extent of trading activity, and the mean and standard deviation of monthly stock prices, and the rates of return for each firm with stock market data available are shown in Table C-5.

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[17] The choice of using .4 as a cut off value was influenced by the total number of firms that would have remained available for purposes of this analysis. Firms with values of the said ratio less than that could reasonably be assumed to display adequate variation to capture the true covariance of their prices with the market portfolio prices.

Thus, 37 publicly traded firms, primarily involved in nursing home operations were used in the risk study. Stock market data, and accounting data were available on each. In addition, each firm had average stock values in excess of one dollar, and more than 60 percent of the monthly observations of stock prices during 1971-76 showed a change in price. Finally, for the predicting equation, accounting data were available for the nontraded sector from the cost reports analyzed in Part II. The results of the estimation of beta for both the publicly traded corporations and the nontraded homes in the four states are described in Section IV below.

IV. RESULTS

This section is divided into three subsections. The first describes the betas estimated from the CAP model. The second subsection describes the predicting equation estimated. Finally, we report the beta values predicted for different classes of nursing homes in the four states.

A. Estimated Betas of Publicly Traded Nursing Homes

The beta values for 37 publicly traded nursing home firms using the CAP model were estimated as specified in equation IV-(2). Using the interval of one month for deriving rates of return, the period over which the CAP model was estimated varied across firms from two years to six years.[18] The actual period for which market data were available is shown in Table C-5 in Appendix C.

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[18] The choice of both time interval and the length of the period over which the beta is estimated has received considerable attention in the literature. It is generally accepted that beta is sensitive to both the time interval and the length of period examined [Breen and Lerner, 18] and [Myers, 77]. However, it is commonly accepted that the estimates of systematic risk are stable enough that so long as the choice of the time interval and the length of the period examined is contained within reasonable bounds, it is not of any significant consequence. It is quite common to use monthly time intervals and five to ten year periods to estimate beta. The limitations of available data did not permit examination of different periods or time intervals larger than a month. However, we did estimate betas using weekly rates of return and found them to exhibit relatively much higher variance across firms and much lower association between market rates of return and the rates of return of the firm. The instability of betas derived from weekly data caused us to restrict the analysis to monthly data alone.

The estimated betas and their standard errors are shown in Table IV-2. The 37 firms in the table are ordered according to the size of their estimated beta values. The beta values ranged from 2.65 to -.32 with a mean value of .8. The firms were not uniformly distributed across the range. The distribution of estimated betas, summarized in Figure 1, was highlighted by the fact that 70 percent of the firms exhibited a beta value of less than one and over 60 percent had a beta value between zero and one.

These summary values of the betas estimated indicate that, in general, publicly traded nursing home firms are relatively less risky than an efficient (diversified) market portfolio. Several factors may well have contributed to this result, especially those characteristics of the industry that make it relatively immune to uncertainty of earnings and swings in economic activity. First, the increasing numbers of older people in the population assure rising consumption of nursing home services in the future. Second, public support for nursing home services ensures that an individual's ability to pay will not deter the purchase of nursing homes by that individual. Third, the demand for nursing home services is relatively inelastic because the choice of how long some medical or dependency condition can be left unattended is limited. Further, an elderly person, once a resident of a nursing home, faces grave consequences in making a switch from one institution or environment to another. Finally, the increasing incidence and enforcement of certificate of need legislation that restricts entry of new firms, in effect, ensures a high occupancy rate for existing firms.

The major source of uncertainty of earnings in the industry are the vagaries of the state reimbursement policies and plans. Even there, it might be argued that changes are usually known by the industry well in advance. The producers of nursing home services can, to some extent, adjust their actions to minimize the impact of the expected change in reimbursement regulations on their earnings.

The estimation of risk by the CAPM was, however, confined to the publicly held sector of the nursing industry--a relatively small proportion of the whole industry. In the following sections the results of the estimates of riskiness for proprietorship/partnership, and non-traded corporations are presented.

TABLE IV-2

BETA VALUES FOR 37 PUBLICLY HELD NURSING HOME FIRMS 1971-76[a]

Facility Name	Beta Value	Standard Error of Beta	Number of Observations
1. Sossin System	2.65	1.332	47
2. Carex International	2.32	1.027	48
3. National Health Enterprises	1.99	.393	72
4. Wyndon	1.91	.499	26
5. Unicare Services	1.86	1.265	48
6. Community Health Facilities (CHF)	1.56	.294	72
7. Lifestyle Companies	1.46	.807	30
8. Beverly Enterprises	1.44	.307	72
9. Geriatrics	1.36	.194	44
10. National Health Services	1.25	1.727	29
11. Rembrandt Enterprises	1.09	.498	35
12. Berkeley Bio-Engingeering	.98	.490	66
13. Merit	.96	.403	72
14. Continential Care Centers	.96	.240	53
15. Professional Care Services	.90	2.053	38
16 Comprehensive Care	.79	.892	23
17. General Care	.78	.320	72
18. Care Corporation	.77	.344	72
19. Medical Services	.72	.346	56
20. American Medical Affiliates	.71	.333	72

TABLE IV-2

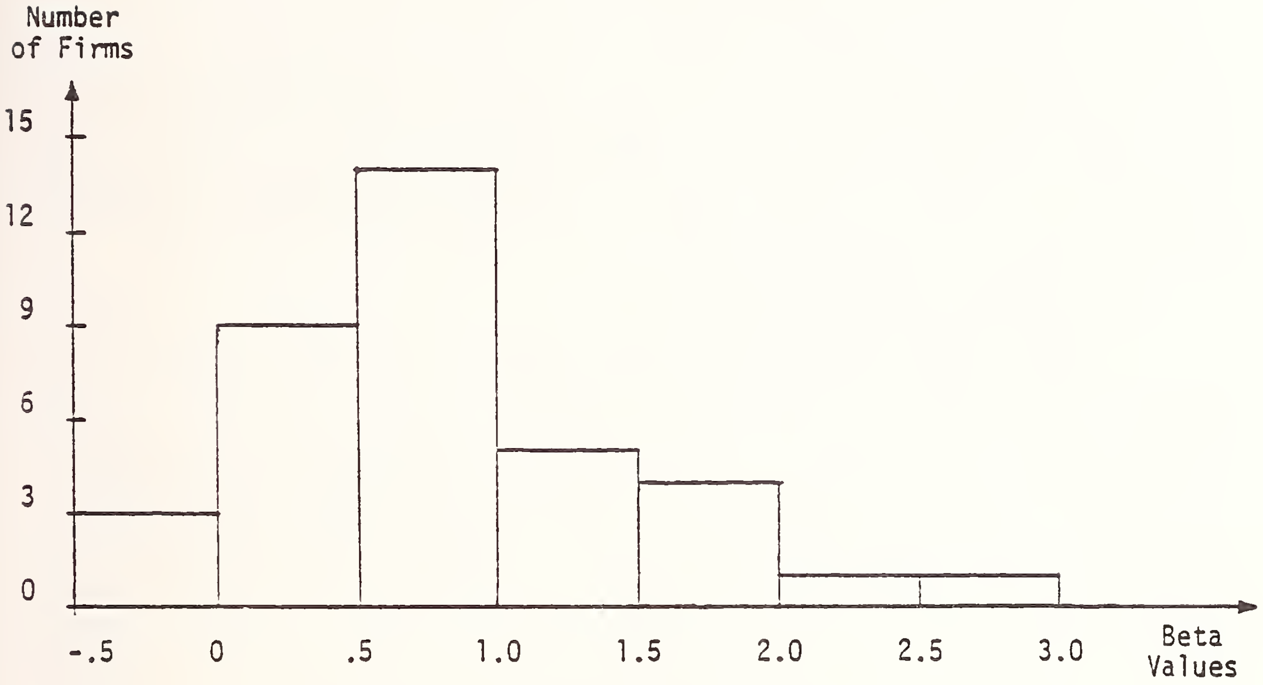
BETA VALUES FOR 37 PUBLICLY HELD NURSING HOME FIRMS
1971-76
(Continued)

Facility Name	Beta Value	Standard Error of Beat	Number of Observations
21. Geriatric/Medical Centers	.67	.251	72
22. Manor Care	.58	.316	72
23. Gold Medallion	.57	.313	70
24. Hillhaven	.55	.317	72
25. Vari-Care	.54	.454	43
26. Medic-Home Enterprises	.47	.419	47
27. Guardian	.44	.518	72
28. Privincial House	.41	.269	72
29. Northern Virginia Doctors Hospital (NVDH)	.34	.287	37
30. King James Extended Care	.28	.650	47
31. Townco Medical Enterprises	.24	.340	60
32. Continued Care Facilities	.23	1.027	25
33. Pacer Phoenix	.20	.007	61
34. Anta	.09	.268	46
35. Alden Care Enterprises	-.12	.381	61
36. American Medical Services	-.28	.337	72
37. Leisure Lodges	-.32	.301	58

[a] The data in this table for the 12 excluded firms are found in Table E-40.

FIGURE 1

DISTRIBUTION OF ESTIMATED BETA VALUES FOR 37
PUBLICLY HELD NURSING HOME FIRMS
1971-76



B. Risk in Nontraded Nursing Homes

The determination of risk in the nontraded sector of the nursing home industry depended upon (1) a predicting equation using the beta values as dependent variables and certain financial ratios as independent variables, and (2) the availability of those same financial ratio variables for firms in the nontraded sector. We first present the results of the predicting equation. Second, we provide the estimates of riskiness obtained for the nontraded homes. These estimates are based on the results of the predicting equation and the values of the financial ratios among the firms in the nontraded sector.

1. The Predicting Equation

In the predicting equation, the estimated betas of the 37 firms shown in Table IV-2 were used as the dependent variable to estimate equation IV-(3) using ordinary least squares. The independent variables in the equation were selected from a larger list of accounting measures contained in Table IV-1. The results of the predicting equation are shown in Table IV-3.

TABLE IV-3

RESULTS OF THE PREDICTING EQUATION FOR BETA VALUES OF 37 PUBLICLY TRADED NURSING HOME FIRMS

Dependent Variable (Estimated Betas)	Mean	Standard Deviation
	,810	,678
Independent Variable	**Coefficient**	**Standard Error**
Constant	.759	.137
INTREV	,580	,358
ERNGR	- ,012	,003
ERNVAR	,034	,016
PFTMAR	-7,244	1,402
R^2	.550	
RSS	7.449	
DF	32	

Fifty-five percent of the variation in the betas was explained by the equation estimated. Coefficients of all the accounting measures included in the equation were significant and of the expected sign except for the coefficient of the earnings growth variable (ERNGR). Leverage of the firm reflected in the ratio of interest on debt to total revenue (INTREV) and the measure for variability in earnings (ERNVAR) were shown to be positively associated with beta. On the other hand both earnings growth and the profit margins (PFTMAR) were found to be negatively associated with beta.

The relative magnitude of these coefficients can best be seen in terms of the mean values of the accounting measure of the publicly held nursing home firms. The mean values are shown in Table IV-4. According to the coefficient estimates, doubling the average values of the accounting measures of publicly held nursing homes would result in the estimated beta's increasing by .18 in the case of interest to revenue ratio, by .1 in the case of the variability in earnings, and decreasing by .13 in the case of growth earnings and by .1 in the case of the profit margin. Thus, fairly large differences in accounting measures across nursing homes are required to generate significant differences in the beta values of those nursing homes. However, Table IV-4 also indicates that the extreme values of accounting measures can be five to ten times larger tnan the mean values. Accordingly, it is possible for the predicted values of beta for individual non-traded nursing homes to vary substantially even though large differences in accounting measures are necessary to achieve the variation. The relative narrowness of the band of predicted betas, therefore, supports the general robustness of the estimated model.

The fact that these four accounting measures in general performed better than other accounting measures are interpreted to mean that the selected measures more closely capture the characteristics that are associated with risk than other accounting data. In the case of leverage, for instance, the size of interest payments on debt rather than the size of debt more closely reflected the riskiness of a firm. Moreover, revenue in each period, rather than equity or asset value, turned out to be the key feature in determining the riskiness of the firm in the nursing home industry. The variability of the earnings

TABLE IV-4

MEANS AND STANDARD DEVIATIONS OF ACCOUNTING MEASURES USED TO PREDICT BETA VALUES, BY TYPE OF NURSING HOME
(Standard Deviation in Parentheses)

Type of Nursing Home by State	Number of Nursing Homes	Leverage Measure	Growth Measure[a]	Variability Measure	Income Ratio
		Interest to Total Revenue Ratio	Average Annual Change in Net Earnings	Coefficient of Variation of Net Earnings	Profit Margin
Publicly Traded Nursing Homes	37	.309 (.281)	10.967 (37.773)	2.859 (6.616)	.013 (.066)
Nontraded Proprietary Nursing Homes					
Colorado	146	.048 (.044)	.759 (5.068)	3.432 (6.481)	.028 (.082)
Georgia	169	.046 (.046)	1.148 (3.298)	2.520 (6.597)	.019 (.057)
New York	131	.017 (.032)	.793 (5.949)	3.225 (12.495)	.023 (.048)
Washington	220	.030 (.032)	.288 (2.230)	3.117 (7.641)	.019 (.069)

[a] Growth is measured in units of 10,000 dollars.

measure that performed the best was not the commonly used measure of variation in earnings, but a measure which was based on the extent of variation in earnings between the current and the previous year. In other words, a year-to-year change was more closely related to the riskiness of the firm than the variation in earnings over a prolonged period. The negative sign of the earnings growth variable was not consistent with expected results. The lower value of beta associated with firms exhibiting high earnings growth may be explained by the regulatory control of the nursing home industry. Since regulatory control, to some extent, immunizes the industry against economic forces, high earnings growth under the controlled environment may not be associated with higher risk. The observed negative relationship is plausible within the regulated environment of the nursing home industry.

2. Beta Values of the Nontraded Nursing Homes

We turn next to the results of the predicted beta values among nontraded facilities. The statewide data are discussed first, and the differences among classes of facilities are considered second.

Statewide Results. Using the coefficients discussed above, we estimated the beta value for the proprietary nursing homes in the states of Colorado, Georgia, New York, and Washington for which data were available on the four accounting measures used in the predicting equation. From these beta values of individual nursing homes mean beta values for each state were computed. The mean and standard deviation of the betas by state are presented in Table IV-5.

The average beta values for nontraded proprietary nursing homes showed very little variation across states (Tavle IV-6). They range from .69 in Colorado to .74 in Washington. These beta values were all less than the average beta values estimated for publicly traded nursing homes. The reasons for the observed differences in the estimated average beta values can be best identified by considering the mean values of accounting measures shown in Table IV-4 and the estimated influence of each accounting measure on the beta value displayed in Table IV-6.

TABLE IV-5

MEAN AND STANDARD DEVIATION OF BETA VALUES FOR PROPRIETARY NURSING HOMES BY STATE
(Standard Deviation in Parentheses)

State	Number of Proprietary Nursing Homes	Mean Beta Value
Colorado	146	.691 (.67)
Georgia	169	.717 (1.48)
New York	131	.702 (.56)
Washington	220	.740 (.59)

Earnings variability on average was not very different across nursing home firms in the publicly traded and nontraded sectors. Accordingly, the differences in the earnings variability measures were not important in explaining the differences in the beta values between the two sectors. The size of earnings growth in the publicly traded sector was significantly larger than the earnings growth in the nontraded sector. On the other hand, the size of profit margin was higher among the nontraded nursing homes. Since both earnings growth and profit margin were negatively related to the beta value, their combined contribution to beta values in both the traded and the nontraded nursing homes was similar. A lower beta value for nursing homes in the nontraded sector can, therefore, be attributed to the influence of the remaining accounting measures, the ratio of interest to total revenue--a ratio that we used as a proxy for the leverage of the firm. Nontraded nursing homes exhibited much lower debt relative to their revenues than publicly traded nursing homes. The ratio was close to tenfold higher among nursing homes in the traded sector than for nontraded nursing homes. This might be a

TABLE IV-6

DISPLAY OF PREDICTED VALUES USING MEAN VALUES OF ACCOUNTING MEASURES, BY TYPE OF NURSING HOME

Type of Nursing Home by State	Number of Facilities	Predicted Beta Value	Estimated Influence of the Accounting Measure on Beta Value				Constant Term
			Leverage Measure	Growth Measure	Variability Measure	Income Ratio	
			Interest to Total Revenue Ratio	Average Annual Change in Net Earnings	Coefficient of Variation of Net Earnings	Profit Margin	
Publicly Traded Nursing Home Firms	37	.810	.179	-.132	.098	-.094	.759
Nontraded Proprietary Nursing Homes							
Colorado	146	.691	.028	-.009	.116	-.203	.759
Georgia	149	.719	.027	-.014	.085	-.138	.759
New York	131	.701	.010	-.010	.109	-.167	.759
Washington	270	.740	.017	-.003	.105	-.138	.759

reflection of the fact that nursing home firms in the traded sector have superior access to capital; i.e., lower borrowing rates. The lower costs of debt financing might have led the publicly traded firms to increase the relative size of their debt and also to increase the extent of their vertical/horizontal integration. This may be the reason why the beta values associated with the nursing homes in the nontraded sector were lower than those values for the publicly traded nursing homes. Finally, the differences in beta values across the four states studied were minor and were found to be not significantly different from each other, based on a t-test equivalence of mean values.[19]

The values of predicted betas indicated that the publicly traded nursing homes, on average, were riskier and much larger than the non-traded proprietary nursing homes. Intuition would have led us to believe otherwise. Small size of nursing home firms, aside from small facilities, should make them more risky. Small businesses are more prone to bankruptcies and failures than large businesses. Of course, the nursing home industry is regulated. These regulations protect all existing providers, including the small firms, from market competition. Certificate of need laws remove some competition through restrictions on entry, cost-related reimbursement systems allow inefficient providers to exist, and large government purchases of nursing home services reduce the probabilities of defaults in the payment of obligations of small firms. Economic inefficiencies persist because of the politicization of the market forces. Under these conditions, there is no reason to expect small nursing home businesses to have any major disadvantages relative to large providers of nursing home services. These very circumstances explain the fact that on average the riskiness of investment in the nursing home industry was relatively lower than the riskiness associated with the market. A diversified portfolio of securities and assets was defined in the CAP model to have a beta value of one. Evidence in this analysis indicated that nursing home operations for large publicly traded firms, or for the combination of relatively small proprietorship/partnership and nontraded corporations in these four states, were 20 to 30 percent less risky than investment in an efficient market portfolio.

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[19] Although the hypothesis that the mean beta values between Washington and Colorado were the same was rejected at the .90 level of confidence, the difference in mean beta values was consistent with the hypothesis that the vagaries of state reimbursement policies may be a major source of uncertainty affecting risk. Washington made several changes in its reimbursement policies, beginning in 1973. Colorado maintained a relatively stable reimbursement and regulatory environment over the period of this analysis. More extended analysis across several states would allow a formal test of this hypothesis.

Predicted Beta Values for Different Classes of Nursing Homes. Differences in average beta values across groups of nursing homes were computed in each state. The proprietary nursing homes were divided into sets of two groups for each of the following characteristics: the number of beds in a nursing home, type of ownership, occupancy rate, form of ownership organization, private to total patient ratio; debt to asset ratio, and equity to debt ratio. The median value of each characteristic in the state was used to classify the nursing homes into the two groups for that characteristic. Separate average beta values by state were computed for each of these groups of nursing homes. The differences in the average beta values of the two groups for each characteristic in a state were subjected to tests of equality using t-value tests.

Table IV-7 shows by state the median value of the characteristic variables used to classify nursing homes into groups. The mean and standard error of predicted beta values by these characteristics are shown in Tables IV-8 through IV-11. The data in each table are discussed in turn.

(i) The average beta values of nursing homes that own their facilities and nursing homes that rent their facilities were not shown to be significantly different from one another in any of the states except Colorado (Table IV-8). In the State of Colorado rented facilities on average were riskier than the owned facilities. But the data when examined across all states on the

TABLE IV-7

MEDIAN VALUE OF CHARACTERISTICS USED TO CLASSIFY NURSING HOMES, BY STATE

State	Nursing Home Characteristics				
	Number of Beds	Occupancy Rate	Private to Total Patient Ratio	Debt to Assets Ratio	Equity to Debt Ratio
Colorado	90.50	.92	---	.87	.15
Georgia	87.75	.96	.15	.79	.19
New York	104.00	.98	.26	.89	.12
Washington	80.83	.93	.32	.76	.31

whole does not show that there was any significant difference in the riskiness of nursing homes between those owned/operated and those leased/operated.

(ii) Whether nursing homes were incorporated did not, on average, affect the riskiness of nursing homes (Table IV-8). Once again, only in the State of Colorado was the predicted average beta value found to be significantly different between corporations and proprietorships/partnerships. Incorporated nursing homes were found to be relatively riskier. However, the average beta value was not found to be close to one, even in a single case, lending further support to the conclusion that nursing home operations were, in general, less risky than a diversified portfolio of securities.

(iii) The predicted average beta values for nursing home groups by facility size showed that in the states of Colorado and New York higher riskiness was associated with larger facilities (Table IV-9). In Georgia the opposite was the case and in Washington no systematic

TABLE IV-8

MEAN AND STANDARD ERROR OF PREDICTED BETA VALUES BY FORM OF OWNERSHIP AND TYPE OF OWNERSHIP ORGANIZATION FOR PROPRIETARY NURSING HOMES, BY STATE
(Standard Error in Parentheses)

State	Form of Ownership		Type of Ownership	
	Own Facility	Rent Facility	Sole Proprietorships and Partnerships	Corporations
Colorado n=146	.663* (.066) N=120	.818* (.064) n=26	.374** (.102) n=35	.791** (.063) n=111
Georgia n=169	.741 (.045) n=135	.622 (.059) n=34	.572 (.127) n=16	.732 (.039) n=153
New York n=131	.662 (.092) n=61	.738 (.045) n=70	.699 (.058) n=115	.727 (.117) n=16
Washington n=220	.732 (.048) n=162	.761 (.065) n=58	.735 (.041) n=64	.741 (.093) n=156

*The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .90 level of confidence.

**The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .95 level of confidence.

TABLE IV-9

MEAN AND STANDARD ERROR OF PREDICTED BETA VALUES BY FACILITY SIZE AND BY OCCUPANCY RATES FOR PROPRIETARY NURSING HOMES, BY STATE
(Standard Error in Parentheses)

State	Facility Size		Occupancy Rate	
	≥ Median Value	< Median Value	≥ Median Value	< Median Value
Colorado n=146	.829** (.083)	.553** (.070)	.577** (.053)	.799** (.094)
Georgia n=169	.649* (.046)	.786* (.059)	.618** (.047)	.818** (.058)
New York n=131	.837** (.081)	.566** (.050)	.677 (.046)	.729 (.087)
Washington n=220	.757 (.055)	.722 (.057)	.621** (.052)	.862** (.057)

*The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .90 level of confidence.

**The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .95 level of confidence.

difference in riskiness was associated with large and small facilities. The evidence was not conclusive, but if there was a relationship between facility size and riskiness of nursing home investment, on balance, large nursing homes are relatively riskier than small ones.

(iv) Examination of riskiness of nursing homes grouped by their average occupancy rates showed that, on average, facilities with lower occupancy rates were more risky than facilities with high occupancy rates (Table IV-9).

Statistically significant differences in the average beta values were observed in all states but New York. In New York the same relationship was observed but it was not significant. The magnitude of the beta values clearly suggests that nursing homes with average occupancy rates above the median were about 25 percent less risky that nursing homes with average occupancy rates below the median.

(v) Next we examined the beta values across nursing home groups according to debt to total assets ratios (Table IV-10). Nursing homes with higher debt to asset ratios were found to have an average higher beta value associated with them in all the four states than those facilities with debt/asset ratios below the median. This is not surprising, since the interest to revenue ratio was found to be negatively associated with beta values and was an accounting measure used to predict the beta values. Both debt and total assets are likely to be positively correlated to interest and total revenue respectively. The predicted beta values were observed to be about 25 percent higher among nursing homes with the debt to asset ratios above the median.

(vi) Nursing homes grouped by equity to debt ratio, as expected, showed that average beta values observed among nursing homes with higher ratios were smaller than those found among nursing homes with lower equity to debt ratios (Table IV-10). The classification of Nursing homes into these groups resulted in very similar beta values both across states and across groups within a state.

(vii) Finally, we examined if predicted beta values varied in accordance with the percent of private residents served by the nursing homes (Table IV-11). In the State of Georgia, nursing homes with higher private

TABLE IV-10

MEAN AND STANDARD ERROR OR PREDICTED BETA VALUES BY DEBT TO ASSET RATIOS AND BY EQUITY TO DEBT RATIOS FOR PROPRIETARY NURSING HOMES, BY STATE
(Standard Error in Parentheses)

State	Debt to Asset Ratio		Equity to Debt Ratio	
	≥ Median Value	< Median Value	≥ Median Value	< Median Value
Colorado n=146	.808** (.064)	.574** (.088)	.623* (.087)	.797* (.065)
Georgia n=169	.832** (.057)	.601** (.047)	.564** (.044)	.369** (.057)
New York n=131	.878** (.079)	.525** (.048)	.513** (.045)	.895** (.081)
Washington n=220	.885** (.063)	.592** (.043)	.597** (.043)	.883** (.064)

*The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .90 level of confidence.

**The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .95 level of confidence.

resident days to total resident days had a statistically significant higher average beta value than nursing homes with lower private resident days to total resident days. However, the reverse was the case in New York. In Washington, no significant difference was obaserved across the two groups. For the State of Colorado no resident data were available to test the difference in predicted beta values across the two groups. In general, the evidence was inconclusive.

TABLE IV-11

MEAN AND STANDARD ERROR OF PREDICTED BETA VALUES BY PRIVATE RESIDENT DAYS TO TOTAL RESIDENT DAYS RATIOS FOR PROPRIETARY NURSING HOMES, BY STATE

(Standard Errors in Parentheses)

State	Private Resident Days to Total Resident Days	
	≥ Median Value	< Median Value
Colorado[a] n=146	n.a.	n.a.
Georgia n=169	.782** (.081)	.566** (.050)
New York n=131	.508** (.046)	.894** (.079)
Washington n=220	.683 (.058)	.798 (.054)

[a] Resident data were not available.

*The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .90 level of confidence.

**The hypothesis that the mean beta values are the same between the two groups of facilities in a state is rejected at .95 level of confidence.

C. Summary of Results

The most important result of the Risk Study is that equity investment in the nursing home industry in general is less risky than investment in an efficient market portfolio. Beta measures of risk estimated by the Capital Asset Pricing Model and a predicting equation relating financial ratios to the risk measure beta, consistently were less than the beta risk measure for the market. Mean beta values ranged between .508 and .895 for various groups of facilities, for all nontraded firms (facilities) in the four states ranged only between .699 and .747. The 37 publicly traded firms, using the CAP model directly had a mean beta value of .8. All of these estimates of risk indicated an average riskiness of investments in nursing homes to be 20 to 30 percent below the market measure of risk at 1.0.[20]

Further, the results showed that, on average, publicly held nursing homes were associated with higher risk than the nontraded nursing homes. Across groups of homes, classified by various characteristics of facilities, on average, predicted risk values were higher among nursing homes with relatively lower occupancy rates, among nursing homes with relatively larger number of beds, and among nursing homes with relatively higher debt to asset or debt to equity ratios. On the other hand, the average predicted beta values were inconclusive as to whether or not statistically significant differences in systematic riskiness existed between nursing homes that owned their facilities and those that rented facilities, between nursing homes that had a high proportion of private residents and those that did not, and between nursing homes that were incorporated and those that were proprietorship/partnership.

V. CONCLUSIONS AND POLICY IMPLICATIONS

The findings that the riskiness of investment in the nursing home industry, in general, was less than the risk associated with investment in the market as a whole are important results of the Risk Study. Both the consistency of results and their statistical significance supported the conclusion that the results are robust. Although there were factors which may act to increase risk in the nursing home industry, such as the uncertainty of political decision making and the vagaries associated with revisions of reimbursement regulations, there were counterbalancing factors that reduce riskiness in the industry, such as the assurances of payment from government and the certainty of a steadily rising demand for nursing home services from an aging population. Our results suggested that risk reducing factors have a dominating influence on the industry and affirm a lower risk associated with nursing home investment than the risk associated with investment in a fully diversified market portfolio.

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[20] The discussion of the beta measures of relative riskiness was included in Section II.B.1 above.

The assessments of the relative value of risk associated with nursing homes suggest policy implications regarding the implementation of specific reimbursement provisions for compensation of risk. In the first place, if the rate of return on equity capital in a reimbursement system allows a return equivalent to the rate of return to the market at large, i.e., the average rate earned from an efficient (diversified) investment portfolio, then our findings would suggest that additional compensation for risk is not warranted in the nursing home industry. In fact, the predicted average beta value of less than 1.0 might be argued as a basis to justify that the allowed rate of return should be lower than the market rate of return. For instance, direct application of the CAP model to a predicted average beta value of .7 would be to allow only 10 percent rate of return on equity capital when the market rate of return is 12 percent and the rate of return on Treasury bonds is 5 percent.[21]

Our results are strong; however, they are insufficient alone to justify paying a negative risk premium to nursing homes, i.e., paying less than the average rate of return in the investment market at large. We reach this conclusion because the study of investment risk is a growing field. The existing models of estimating risk, especially the CAP model, have, indeed, considerably improved the understanding of risk associated with different types of investments. However, the empirical precision of these models for assessing risk has yet to be established conclusively. Extending the use of the estimated risk values to determine the exact rate of return at which an individual or group of nursing homes should be reimbursed is questionable.

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[21] These rates of return follow from the equilibrium condition of the CAP model expressed in equation IV-(1).

Our reservation on the use of the findings in this study should not detract from the basic conclusion that the investment in the nursing home industry was relatively less risky that investment in the market at large. That conclusion was not only exhibited by the average beta value of all nursing homes in a state but also by the average beta values of nursing home groups that were examined. In every case the predicted beta value was found to be less than 1.0.

The statistically significant differences in risk, that were found between various groups of nursing homes, also raise an issue for reimbursement policy. Should such variations be recognized and differentially compensated in a reimbursement system? Our answer is "No" because that is not an appropriate use of compensation for risk in a reimbursement system. Variations in riskiness stem from the individual decisions of nursing home owners and investors rather than from the inherent nature of the industry. The riskiness of the whole industry is the more appropriate measure and not the riskiness of the investment in individual homes or groups of nursing homes. It is the riskiness of investment in the whole industry that should be taken into account in estimating a rate of return in a reimbursement system. Finally, risk is not a cost item and should not be so treated in a cost-based reimbursement system. If differences in riskiness were recognized and differentially compensated among groups of homes or by individual firms, incentives to depart from risk/return positions nursing homes would assume if there were no reimbursement payment would be created. The costs of this suboptimal behavior under cost-related reimbursement would be borne by the government and by society at large. Should this procedure result in increased expenditures, as it might well do, then profits of nursing homes would be increased and growth patterns of the industry affected accordingly.

Finally, high risk in the nursing home industry has been claimed on the grounds that the reimbursement systems are continually revised resulting in greater uncertainty regarding revenue expectations. It is true that the reimbursement systems have undergone several changes over the last 10 years. To what extent these changes have increased the risk associated with investment in the nursing homes is not clear. Government actions on reimbursement issues are invariably preceeded by a lengthy public debate. The foreknowledge of the potential revisions of reimbursement policies allows nursing homes to adjust their responses and to some extent mitigate the impact of such changes. Even if the influence of these changes were large, they should not be considered in isolation. As we discussed above in Part III, government regulation of the nursing home industry also provides nursing homes with protection against new entry, protection against default of payment, and political and legal recourse to higher payments. There are features of the reimbursement and regulatory environment that considerably reduce the riskiness of equity investment in the industry. *A priori*, it is not possible to asset whether, or to what extent, government regulation of the nursing home industry has increased the risk in the industry. Rather, our findings are consistent with the hypothesis that risk resulting from uncertainty associated with government reimbursement is more than offset by the protection against competition afforded by government regulations that accompany such reimbursement and other inherent characteristics of the market for nursing home services.

PART V

VERTICAL AND HORIZONTAL INTEGRATION
AND
THE PROFITABILITY OF NURSING HOMES

PART V

VERTICAL AND HORIZONTAL INTEGRATION AND THE PROFITABILITY OF NURSING HOMES

I. INTRODUCTION

Substantial concern exists over the profitability of large firms in the nursing home industry. The U.S. Senate Special Committee on Aging, Subcommittee on Long-Term Care, under the chairmanship of former Senator Frank Moss of Utah, had been investigating multifacility nursing home operations for several years. As late as 1976, under threat of Congressional Committee subpoena power, the Committee canvassed over 135 companies for information regarding their involvement in the provision of nursing home services.[1] Allegations that entrepreneurs were more interested in real estate transactions than in the delivery of quality nursing home services were made by state Medicaid agencies and others.[2] As late as 1978, the Federal Trade Commission was discussing fraudulent activities of national multifacility firms, and had been considering for at least two years what investigations to undertake in the nursing home industry.[3]

There is wide agreement that multifacility firms constitute a larger share of the industry now than a few years ago, even though no precise data are available on the number of such firms. The investigation of the publicly traded corporations reported in Part IV and Appendix C showed a larger number of these firms in 1976 than in

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[1] Knowledge of the efforts on the part of the Senate Subcommittee was obtained through conversations with the Subcommittee staff as well as from information provided by the National Council of Health Care Services, the organization of national multifacility firms in the nursing home industry.

[2] A dramatic rendition of the profitability theme was Tender Loving Greed [68].

[3] Information was provided through conversations with Federal Trade Commission representatives.

1971. Other statements by the American Nursing Home Association [9], the Morton Research Corporation reports [73, 74], and the information from the Senate Subcommittee on Long-Term Care confirm the growth in the number of larger multifacility firms. Furthermore, the average number of beds per facility has increased substantially from 40 in 1963 to 75 in 1973-74 [45]. Associated with the growth in average facility size has also come an increase in the use of the corporate rather than the proprietorship/partnership form of business organization. There is some concern that the traditional "mom and pop" facilities are likely to be completely replaced by larger sized facilities under corporate ownership and management.[4]

The extent to which the growth in the number of multifacility firms and further concentration in the nursing home industry can be expected to continue depends upon the potential for higher profitability associated with the size or the extent of integration of the firms. This study attempts to confirm whether a positive relationship between profitability and extent of integration is observed among multifacility firms in the nursing home industry. If such a relationship exists it might be argued that there are features in the current systems of regulation and reimbursement of nursing home services that favor larger and integrated firms. On the other hand, if such correlation is not observed then one might conclude that further integration is not likely and the integration of firms that was observed at the outset of Medicaid has run its course.

The remaining sections in this study of profitability and the extent of integration among multifacility nursing home firms include a discussion on research strategy in Section II, a description of the data in Section III and the report of results in Section IV. The final section sets forth the conclusions and policy implications of the study findings.

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[4] See Part I on the Development Growth of the Nursing Home Industry.

II. RESEARCH STRATEGY

The traditional questions asked in the economics literature on horizontal and vertical integration have been whether the firms in an industry were acting in a competitive manner and whether the structure of the industry was atomistic. The concern centered on the misallocation of resources resulting from the deviation of the industry structure from pure competition. Although our approach drew heavily on the traditional hypotheses and theories in economics, the emphasis in this study was somewhat different. Rather we were concerned with determining the influence of reimbursement policies on the market and the extent to which profitability increased as the firm became more integrated. We considered two different dimensions of integration, vertical and horizontal. We defined vertical integration as the expansion of business activities through acquisition of control both over nursing homes and over production and distribution of goods and services used by nursing homes. Horizontal integration was defined as the expansion of the firm's nursing home activities through lease, acquisition, or operation of larger numbers of nursing homes. We assume that profitability of a nursing home firm was determined by the interaction of reimbursement policies and the extent of integration. If reimbursement policies favor integration then a positive relationship between profitability and integration would be observed.

We first set forth the rationale for the approach taken in this study, and second provide the empirical specification of the model including the definition and basis for selecting the variables used in the analysis.

A. Rationale for Research Approach

We followed the approach that changes in industry structure, such as the growth in the average size of the firm, can be explained by applying marginalists' principles to the functions of the firm. Under this interpretation, which is discussed further in Appendix D, changes in the legal and social environment under which firms operate lead to changes in the efficient size of the firm and in the scope of activities undertaken. These changes were identified as vertical and horizontal integration and were profit maximizing responses of firms to changes in constraints faced by them.

The central hypothesis proposed in this study is that the greater the degree of integration, the higher the rate of return and profitability. Entrepreneurs and capitalists invest resources in those opportunities where profits or the rate of return on capital is highest. Profitability is a criterion for growth. Since there was greater growth among large multifacility firms than other firms, relatively higher profits and rates of return were predicted to be associated with the extent of integration.

The primary question, however, is why integrated firms would be expected to perform better than nonintegrated firms. Several reasons come to mind. Larger firms have a greater ability to adapt to the constraints imposed by the Medicare and Medicaid programs than smaller nursing home firms, and can accordingly increase profitability as the firm size increases. Nursing home reimbursement plans and regulatory systems are by their nature likely to give sophisticated or financially powerful agents in the market an advantage over the others. Such units, with substantial resources to employ expert accountants and lawyers, can more economically overcome the costs imposed by government regulations and requirements than a small facility/firm. Furthermore, there appear to be substantial fixed costs of doing business with the government--costs of setting up management information and accounting systems, assuring compliance with reporting regulations, and so on. If this is the case, the result is economies of scale. The value of a more sophisticated accounting procedure can be translated into dollars per patient day. The profitability of an investment in such a system would be directly correlated with the number of patient days, hence, an advantage for larger firms.

If the above reasons are valid, then the observed trend towards multifacility firms was a rational response of entrepreneurs to changing circumstances in the market. Providers were taking advantage of scale economies in working with the government by expanding the size of their operations. Since the bed capacity of a faility will run into diseconomies beyond some number of beds, further scale economies of working under state regulatory and reimbursement systems were obtained by acquiring and operating more facilities.

Multifacility firms, under these circumstances, can be expected to have lower average costs of producing a patient day of nursing services than firms with a single nursing facility. If the price in the market is regulated, at least for a majority of patients, and is the same for all providers of long-term care, multifacility firms should show higher profits.[5] Furthermore, these profits should be positively related to the size of the nursing home operations of the firm. This rationale holds for expansion of firm nursing home operations through lease, acquisition, or operation of a larger number of nursing homes, all of which we define as aspects of horizontal integration.

The nursing home industry has also shown signs of vertical integration.[6] Integration in most cases, however, was not a result of expansion of firms in the nursing home industry, but rather expansion of firms that produced goods and services used by nursing homes into the acquisition and operation of nursing homes. Prominent among such firms were hospital administration firms, firms distributing medical equipment and supplies or pharmaceuticals, construction and real estate firms, and in some cases, capital investment consortiums.

Reasons for this trend towards vertical integration could also be found in the reimbursement systems under Medicare and Medicaid. Reimbursement porcedures for public patients are often based on the costs of providing the services. If a nursing home can "sell to itself" services from related organizations at marginal cost which is lower than market price then the vertically integrated firm in the nursing home industry is in a superior position to increase profits. An example of such an integration of operations would be to operate and own a pharmacy rather than use a local pharmacy. Increased profitability, as in the case of horizontal integration, should be positively related to the extent of vertical integration within the firm.

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[5] In the case where a firm has facilities in two or more states, with one state on flat rates and the other on a cost-related basis of reimbursement, it may be possible to allocate disproportionately central office expenses to the facility in the state with cost-related reimbursement and thus increase aggregate profits across the two facilities. This possibility is considered below as a characteristic of horizontal integration.

[6] See, for example, the difficulties encountered in identifying and defining publicly held nursing home firms which are described in Appendix C.

We are cognizant that the persistence of disparity across firms in the rate of return within an industry is not common in open markets under competitive conditions. But it is possible in an industry where price is not competitively determined but is based on either justifiable cost of producing services or costs averaged across facilities in a region. Then those firms which have relatively lower real costs will make higher profits and there will be a tendency among high cost firms to change their structure, i.e., the level of integration, and thereby improve their profitability.

We turn now to the empirical specification of the model for examining the relationship between profitability and vertical and horizontal integration in nursing home firms.

B. Empirical Specifications

1. The Form of the Equations

The analysis to determine the relationship between profitability and horizontal and vertical integration was conducted using multiple regression techniques. Equations were estimated which used profitability as the dependent variable and contained as explanatory variables measures of vertical and horizontal integration and control variables describing characteristics of the firm such as average facility size and geographical range of its operations (single state, multistate, or national). The unit of observation was the firm.

In particular, equations of the following form were estimated:

V-(1)

$$P = \alpha_0 + \alpha_1 H + \alpha_2 V + \sum_{i=3}^{k} \alpha_i X_i + \varepsilon$$

where

P = a measure of profitability;

H = a measure of horizontal integration;

V = a measure of vertical integration;

X_i = variables which control for other factors affecting profitability;

α's = coefficients of the variables;

ε = error term.

2. Variables of Interest

We briefly describe the dependent variable, the explanatory variables, and the control variables used in the equations.

Dependent Variable. The dependent variable was the book rate of return, a measure of profitability. Although a real rate of return is the ideal measure, only accounting or book rates of return can be constructed from the available financial accounting data on firms. (The difference between accounting and real rates of return has been discussed in some detail in Section II of the State Studies, Part III.) Although the accounting measure of return has certain drawbacks, it has been used extensively in similar research, primarily because accounting data are the only available financial data on the operations of the firm.

We measured the book rate of return as follows:

$$\text{V-(2)} \qquad r = \frac{NINC_1 + NINC_2 + NINC_3}{TASS}$$

where

r = rate of return;

$NINC_1$ = net income from nursing home operations;

$NINC_2$ = net income from managed facilities;

$NINC_3$ = net income from leased out facilities;

$TASS$ = book value of total assets.

This was a rate of return on all assets of the firm and not merely a return to owner's equity.[7]

Explanatory Variables. These variables were divided into those defining and measuring either horizontal or vertical integration. The former was defined as the expansion of the firm's nursing home activities through lease, acquisition, or operation of larger numbers of nursing homes. Horizontal integration was measured by the size of the firm's nursing home operations. Size was measured by both the number of beds in multifacility firms and by the number of facilities in the firm. Six different operational measures of horizontal integration were examined for the multifacility firms.

- H1: Number of beds owned and operated.
- H2: Number of beds operated through lease, ownership, or management contract.
- H3: Total beds, including beds leased out.
- H4: Number of facilities owned and operated.
- H5: Number of facilities operated through lease, ownership, or management contract.
- H6: Total facilities, including facilities leased out.

Vertical integration was defined as the expansion of business activities through acquisition of control over both nursing homes and over production and distribution of goods and services used by nursing homes. It refers to the amount and number of related activities that a firm controls. We used two measures of the extent of vertical integration.

- V1: Ratio of revenue generated from nursing home related activities to the sum of revenues from nursing homes and nursing home related activities.
- V2: Revenue generated from nursing home related activities.

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[7] The rate of return computed by equation V-(2) will be recognized as different than the definition used in equations III-(5) or III-(6). We would have preferred to use the overall rate of return computed in Part IV, but the data required to do so were not available for the multifacility firms included in the integration study analysis.

The V1 measure is based on the mix of activities undertaken by a vertically integrated firm. The higher the ratio of total revenues from activities related to nursing home operations to the sum of revenues from nursing homes per se and from nursing home related activities, the greater is the extent of vertical integration, and the higher the expected rate of return. In the case of the V2 measure, only revenues generated from nursing home related activities were used. The greater these revenues, then the greater is the extent of vertical integration.

Control Variables. Other factors not directly related to vertical or horizontal integration may also influence the variation in profitability. Our estimates of the relationship between integration and profitability will be biased if these effects are not taken into account. Accordingly, we examined the effects of the following control variables in order to identify more precisely the relationship between vertical and horizontal integration and profitability. The rationale for each variable is briefly set forth.

- Average facility size (AFS): This variable was defined as the average number of beds per facility. If economies of scale within facilities of a firm were not being exploited, then the resulting inefficiency should adversely affect the profitability of the firm. Thus, this variable should separate simple within-facility scale effects from the horizontal integration effects we are attempting to estimate.

- Geographical dispersion (GED): Geographical dispersion may increase profitability, if the distribution of facilities was achieved to take advantage of the differences in the reimbursement systems across states. An opportunity for advantage potentially existed in the case with facilities in two states, where one state had a fixed rate and the other had a cost-based reimbursement rate. If the firm was able to transfer any nursing home costs from the fixed rate state and show them as expenditures in the cost-based rate state, then the profit position of the firm would improve. Geographic dispersion of facilities across states does vary across firms.

Geographical dispersion of operations was defined by the following index.

$$GED = \frac{\sum_i (FAC_i)^2}{(\sum_i FAC_i)^2}$$

where

GED = measure of geographic dispersion;

FAC_i = number of the firm's facilities in i^{th} state.

According to this measure, the more dispersed the firm's operations across states the lower the number. If all facilities of the firm were in the same state, the index number will have the value of 1.

- Assets (A): The book value of total assets was used as one control variable. This variable was included to capture differences in the total investment of the firm, as distinct from the degree of horizontal integration. Inefficiencies related to nonoptimal size firms, as separate and distinct from the non-optimal size of facility described above, would be reflected in profitability.
- Equity (E): In addition to the size of the firm's capital stock, its distribution between debt and equity could affect the rate of return. By including the book value of equity and total assets we can control for the effects of the distribution of debt and equity capital and, at the same time, separately estimate the relationship between debt and equity and profitability.
- Private patient days/total patient days (PPD): The ratio of private patient days to total patient days was used to control for any differences in the profitability of the private patient and the public patient markets. The variable did appear statistically significant in the analysis of variations in rates of return in the State Studies.[8]

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[3] Other control variables were investigated, such as owner/lessee relationships as measured by the percentage of nursing home assets that were leased, and occupancy rate. Either data were inadequate, or in early examinations the variable was dropped because of meaningless results.

3. Methods of Analysis

Several functional forms were used with different combinations of explanatory and control variables. A simple linear relationship between all variables was finally used.

The preferred operational measures of horizontal and vertical integration were selected on the basis of the precision of the coefficient estimates. In all cases both V1 and V2 measures of vertical integration had coefficients with the same sign. Similarly, all of the regression coefficients for the six measures of horizontal integration had the same sign. We chose V1, the ratio of nursing home related revenues to total revenues, and H4, the number of owned and operated facilities, as the preferred measures of vertical and horizontal integration, respectively.

The control variables were chosen according to whether or not their inclusion increased the $\bar{R}^2$. We experimented with excluded variables to ensure that their deletion did not alter estimates of any of the parameters which remained.

On the basis of the above process, the preferred specification was as follows:

$$\text{V-(3)} \qquad r = \alpha_0 + \alpha_1 V1 + \alpha_2 H4 + \alpha_3 GED + \alpha_4 A + \alpha_5 E$$

After a brief discussion of the data, the results of the above regression are considered.

III. DATA

The data for the Integration Study were obtained from questionnaires administered to publicly held nursing home corporations in 1976. The questionnaires asked detailed questions concerning nursing home and nursing home related operations for 1974 and 1975.[9]

Survey questionnaires for 41 firms were available to us. Because of missing data, only 29 of these were usable; and 1 of these only for 1974. Thus data on 29 firms in 1974 and for 28 in 1975, a total of 57 observations, were used in this analysis. The data are described in detail in Appendix D.

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[9] The questionnaires were supplied without identification of the firm. Thus we were unable to combine other more detailed financial data from the 10K forms submitted by each firm to the Securities and Exchange Commission with the data on the questionnaires. Accordingly, the ability to use only the questionnaire data severely restricted the scope of the analyses.

IV. EMPIRICAL RESULTS

The results of the regression estimated under equation V-(3) are displayed in Table V-1.

TABLE V-1

RESULTS OF REGRESSION OF RATE OF RETURN ON INTEGRATION VARIABLES FOR 29 MULTIFACILITY FIRMS, 1974-75

Variable	Results	
Dependent[a]	Mean	Standard Deviation
	.023	.020
Independent	Coefficient	Standard Error
CONSTANT	.031	
V1	-.019*	.101
H4	-.001	.0005
GED	-.040**	.015
A	-.581 E-9**	.208 E-9
E	.219 E-9**	.980 E-10
R^2	.28	
$\overline{R}^2$	.21	

*Significant at α = .10 with a two-tail test.
**Significant at α = .01 with a two-tail test.

[a] This average rate of return appears low because of the definition of book rate of return that was used in the Integration Study. This is the ratio of net income to total book value of assets. See equation V-(1). To make this rate comparable to those in equations III-(5) or III-(6), current depreciation and interest would be added to the numerator and accumulated depreciation to the denominator. See the discussion in the text and footnote above on the reasons for use of this measure of the rate of return.

Both measures of integration were negatively related to the rate of return. The coefficient of V1--the ratio of revenue generated from nursing home related activities to the sum of revenues from nursing homes and nursing home related activities--was statistically significant at the 90 percent confidence level. Although the rate of return was also negatively related to the degree of horizontal integration, H4, this coefficient, though consistently negative in all regressions, never met any conventional tests of statistical significance.[10] Of course, the coefficients for both V1 and H4 were computed while controlling for each of the other variables in the equation.

The negative association of the rate of return and measures of vertical and horizontal integration was contrary to what was expected. The results, however, are quite robust with respect to the integration variable definitions. The results, furthermore, were not changed by splitting the data into 1974 and 1975 components.[11] However, the negative correlation of the rate of return with the measure of vertical integration, while quite strong, does little to explain variation in rates of return. The V1 variable, which is a ratio, is bounded by zero and one, with the most highly integrated firms having a value of one. The maximum value of the ratio reduces the expected rate of return by only 1.9 percentage points. Since the value of V1 for the firms in the sample of 29 typically falls well within the range of zero to one (the mean value was .184); the effect, though significant, may be small. At the same time, given a method of defining the rate of return which biases the rate downward, even a .5 percentage point shift constitutes a change of nearly one-fifth in relation to the mean rate of return of 2.3 percent (Table D-3).[12]

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[10] As was noted above, several measures of vertical and horizontal integration were used in the equations. The results reported here are the most robust of any obtained. Furthermore, the negative coefficient signs for measures of both vertical and horizontal integration were consistently obtained, although not always statistically significant.

[11] Of course a condition for pooling the data in the first place was that no results would be changed by the process.

[12] The rate of return was defined using net income in the numerator and the total of book assets in the denominator. See equation V-(1).

Even though the above results indicated that nursing home firms failed to increase profitability by integration, the fact is that these firms were growing in number during the post-Medicaid/Medicare years and during the early 1970s. The answer to this growth may well lie precisely in the character of the reimbursement policies of the period. This conclusion is based on the fact that profitability of multifacility firms increased as the operations of these firms were geographically dispersed. The variable GED was not only highly statistically significant but represents the largest effect upon the rate of return of any of the variables. GED is an inverse measure of dispersion, and thus the negative coefficient indicated that multistate operations, which were multifacility firms, were significantly more profitable than single state firms. Reimbursement policies varied across states, and thus the ability to expand by operating facilities in more than one state would allow firms to take advantage of differences in reimbursement systems to shift firm costs among states in a manner to improve rates of return. We hypothesized above that firms operating facilities in a state with a flat-rate reimbursement system might be able to shift some costs of management and other overhead costs in that state to facilities operated under a cost-related reimbursement system. Since higher costs in the latter state would not reduce profits, profits would rise for the facilities in the flat-rate reimbursement state. Our data do not allow an analysis with respect to what states were involved in the GED variable. However, given the results that integration _per se_ led to lower profitability, the ability to profit by operating in several states would appear to be related to the opportunities available to use the variations in state by state reimbursement systems to increase profitability for the multifacility firm.

The remaining variables in equation V-(3) include A - assets, and E - equity. These variables were included to capture the effects of debt and equity on profitability. The coefficients of A and E can be combined to estimate separately the relationship between debt, equity, and profitability, as follows:

V-(3) $r = \alpha_0 + \alpha_1 V1 + \alpha_2 H4 + \alpha_3 GED + \alpha_4 A + \alpha_5 E$

since A = E + D, where D is debt; thus:

V-(4) $r = \alpha_0 + \alpha_1 V1 + \alpha_2 H4 + \alpha_3 GED + \alpha_4 D + (\alpha_4 + \alpha_5)E$

Accordingly, debt and equity capital have different effects on profitability. The effects of increases in both were significantly negative, but debt showed a stronger effect: -.581 E-9 for debt (holding E constant), versus -.362 E-9 for equity, (i.e., 219 E-9 - 581 E-9). In all cases these results were statistically significant, and consistent with the results of analyses in the state studies which indicated a negative relationship between profitability and the amount of equity, the debt equity ratios, or size.

In summary, then, the results of the limited analyses in the integration study showed:

- Profitability was negatively related to measures of both vertical and horizontal integration for multifacility firms;
- Profitability was positively related to the geographic dispersion of multifacility firms across states;
- Profitability of multifacility nursing homes was negatively related to the amount of debt and equity.

V. CONCLUSIONS AND POLICY IMPLICATIONS

We concluded that the most direct implications of the results are twofold. First, the evidence was consistent with the hypothesis that multifacility firms have grown to take advantage of cross-state differences in reimbursement systems. Second, integration by multifacility firms, as an issue related to the control of the market, is an inconsequential matter.

The negative correlation between integration measures and profitability must be interpreted with caution. The sample of only 29 firms was rather small. The inability to develop detailed data from the SEC records because of the confidentiality ban on the names of the firms for which the questionnaire data were obtained also restricted more extensive investigations and analyses. Whether a larger sample, more detailed data and cross-checking of data between two sources would have revealed different results, must, of course, be left to subsequent research.

Two potential policy issues are suggested by these conclusions. First, if integration has not resulted in higher profitability, then the need to investigate the financial and operational activities of multifacility nursing home firms would be reduced. Second, the implementation of cost-related reimbursement across all states under HEW guidelines pursuant to the 1972 amendments to the Social Security Act may reduce the opportunities for increased profits, which appeared to have resulted from multistate operations.

Thus, even though the findings in this analysis indicate no particular advantages of multifacility firms over single facility firms in the immediate years ahead, a more thorough examintion of the multifacility segment of the industry is clearly warranted. Further, rationalization and concentration of the industry may occur from a number of factors that were not considered in this abbreviated analysis of vertical and horizontal integration and the profitability of multifacility nursing home firms.

PART VI

RESEARCH FINDINGS, CONCLUSIONS AND IMPLICATIONS FOR REIMBURSEMENT POLICY

PART VI

RESEARCH FINDINGS, CONCLUSIONS AND IMPLICATIONS FOR REIMBURSEMENT POLICY

I. INTRODUCTION

This research has examined several aspects of the increasing involvement of government in the regulation and reimbursement of nursing home care. Over the last decade, several types of reimbursement systems, including currently mandated cost-related reimbursement, were used by various states. The experience under these systems has been the focal point of analysis in this project. Four separate but closely related studies were undertaken to determine the relationship between reimbursement policies and key aspects of the long-term care industry. The analyses were designed to examine those aspects and consequences of reimbursement systems that would be useful in evaluating current policy and thus in providing guidance for the future role of government in the nursing home industry under the Medicaid Program.

The major conclusions and findings of this research are summarized below in Section II. These are set forth as a basis for the consideration of the policy implications of this research. In Section III we consider our findings in relation to some general issues in cost-related reimbursement, inasmuch as specific findings and their related policy implications have already been discussed at the end of Parts II through V for each of the four studies. Even though there are serious problems related to the use of cost-related reimbursement, in Section IV we propose some modifications which have been indicated by this research and which should improve the effectiveness of cost-related reimbursement. The final section contains general conclusions and suggested topics for further research.

II. MAJOR CONCLUSIONS AND FINDINGS

The major conclusions and findings in this project concern the interrelationship of profitability, rates of return to capital, growth and reimbursement policies in the nursing home industry. Each of the four studies analyzed one or more aspects of these relationships. From these analyses, taken as a whole, we have concluded the following.

1. The effectiveness of attempts by the states to fine-tune current cost-related reimbursement systems or to manipulate various components of reimbursement plans in the setting of reimbursement rates for achieving a certain goal can be seriously questioned.

The evidence to support this conclusion is substantial. In the analysis of the impact of reimbursement policies on growth in nursing home beds, and by extension upon the profitability of the nursing home industry, there was no evidence to suggest that cost-related reimbursement leads to different growth rates or different profit rates than does flat-rate reimbursement. Further, varying components of cost-related reimbursement schemes for the most part failed to demonstrate any effect upon profits or growth. In selecting as a basis for capital payments, a rate of return on equity capital, a fixed amount per patient day, or a percentage of cost made no difference to growth rates. Neither did limits on such items as property costs, interest, or other specific cost centers appear to make any difference. Only in the cases of a minimum occupancy rate regulation and a total payment limit on the per diem rate was there evidence of an effect upon nursing home profitability. Most features of reimbursement systems simply appear not to matter. In addition, the minor differences in the average rates of return in different groups of nursing homes across the states of Colorado, Georgia, New York and Washington, did not indicate that differences in reimbursement policies had any influence on the rates of return.

2. Payments for capital services under most reimbursement systems have poorly reflected the real costs of capital and contributed to the inefficient and costly use of capital resources.

The consequences of several practices across the various states support this statement. The extreme variation in rates of return on equity capital in contrast to smaller variation in overall rates or return on all assets, indicates that equity-based capital reimbursements diverge substantially from real costs of capital, due to the divergence between book equity and real capital in place. The failure to adjust historical costs for inflation and the inaccurate estimates of depreciation reduce the approximation of real capital costs in the allowances for capital costs based on book values. Further, the existing methods for reimbursing capital costs, such as a "pass through" payment for interest and payments on different bases for owner/lessees than owner/operators, lead to non-optimal debt/equity ratios for firms and also increase borrowing costs.

3. The reimbursement for capital services requires no special premium on the rate of return for riskiness of investment in the nursing home industry.

Investment in the nursing home industry in general is relatively less risky than investment in an efficient market portfolio. Measures of risk obtained through the Capital Asset Pricing Model consistently were less than the beta risk measure for the market. Further, an extension of the measure to the non-traded sector by means of a predicting equation showed the result to hold for those nursing homes as well. All estimates of risk indicated an average riskiness of investment in nursing homes to be below the market measure of risk. Further, even though variations in riskiness were found among various groups of nursing homes, these differences arise from individual decisions of nursing home owners and investors rather than from the inherent nature of the industry. It is the riskiness of the whole industry which should be taken into account in estimating rates of return in a reimbursement system. To compensate risk as a cost item would provide incentives to depart from the optimal risk/return positions which nursing home investors would otherwise assume, and lead to increasing costs to the government.

4. Profitability does not appear to be positively associated with increased vertical or horizontal integration among multi-facility nursing home firms.

Several measures of vertical and hosizontal integration were examined in relation to profitability, and in all cases the relationships were negative for multifacility firms. The apparent trend toward larger publicly held corporations as well as the incorporation of nursing home facilities may be an attempt to reduce investment risk rather than increase profits *per se*. Incorporation and ownership of equity shares allows nursing home investors to increase the diversification of their investments and eliminate unsystematic diversifiable risk associated with single asset portfolios. The evidence in the study, however, was consistent with the hypothesis that multifacility firms have grown to take advantage of across-state differences in reimbursement systems.

III. A CRITIQUE OF COST-RELATED REIMBURSEMENT

The above general conclusions and findings provide little support for cost-related reimbursement systems. Both the evidence on the general ineffectiveness of such systems and the issues raised in the payment of the costs of capital indicate that the concept of cost-related reimbursement as an effective vehicle to address the matter of setting payments for nursing home services for public patients appears in serious need of careful reevaluation and reconsideration. Although the findings and conclusions regarding riskiness of nursing home investment and the relationship between profitability and integration are relatively neutral with respect to some types of reimbursement, even here there are issues raised which cost-related reimbursement systems have yet to face directly. These considerations indicate that cost-related reimbursement may not be the appropriate method for determining rates for nursing home care.

In this section, we consider some of the implications and issues that have been raised by this research and its findings and conclusions. The discussion is divided into three parts. The first subsection raises some questions regarding the general applicability of cost-related reimbursement to the nursing home industry. The second subsection considers conceptual issues in cost-related reimbursement as those are related to the costs of capital and risk. Finally, we discuss pragmatic and practical issues raised in determining appropriate returns to capital in the nursing home industry under cost-related reimbursement.

A. Applicability of Cost-Related Reimbursement to the Nursing Home Industry

Our examination of the structure and character of the nursing home industry raised questions regarding the applicability of cost-related reimbursement for nursing home care. The industry is substantially different than those in which cost-related methods have been used. These methods have been applied under similar plans for the reimbursement of hospital care. In addition, regulation in the public utility field has relied upon cost as a basis for setting rates for some time.

Any justification for cost-based reimbursement on the grounds of a monopolistic or noncompetitive industry does not hold in the case of nursing homes. The nursing home industry essentially meets all of the requirements for a competitive industry, and to our knowledge no one has seriously suggested otherwise. Neither franchised public utilities nor nonprofit community hospitals have these characteristics. We found no market power among multifacility firms. In all four states studied, the firms were small and diverse for-profit firms, including sole proprietorships and partnerships, as well as small corporations.[1]

There is no reason to believe that quality of care can be controlled only in a cost-related reimbursement system. Purchasing Medicaid agencies can be as specific under one payment system as another with what the nursing home care product should be in terms both of quality and quantity, or what the input quantities and services should be. Even though there is merit to the argument taht cost-related reimbursement assures the entrepreneur that quality enhancing services will be reimbursed, and he, therefore, is more likely to supply quality products, the trade-off between any additional quality and its costs must be recognized. There is no assurance that the quality enhancing services of the homes, in fact, will provide marginal benefits to the patient equivalent to the benefits otherwise obtainable from those public funds through other types of services.

B. The Costs of Capital and Some Conceptual Problems

The general reasoning behind a cost-related reimbursement system is straightforward. The government, on behalf of certain individuals, purchases nursing home services. These services, for the most part, are neither unique nor require new specialized providers. The services are available in the general market in more or less the form in which the government wished to purchase them. The price, or reimbursement rate for these services, is to be set on the basis of the cost of producing them, including a "fair" rate of return to capital.[2]

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[1] Although government might be able to exercise monopsonistic power in buying nursing home services, there is no reason to believe the selling side should be less competitive thereby.

1. The Roles of Profit and the Rate of Return

Although there may be some practical difficulties in determining what the cost of producing nursing home services is, a major problem with cost-related reimbursement is the failure to recognize the roles which the return to capital and profit play in determining industry growth and in providing incentives for the efficient use of resources. A reimbursement system that pays only the cost of capital provides no mechanism for change in the current capacity of the industry. The opportunity for profit, an excess over the current cost of capital and the presence of profit for capital owners, is the basis for attracting entrepreneurs to undertake new enterprises or to expand their present ones. Conversely, the absence of such opportunities for profit, or the presence of losses will encourage entrepreneurs and capital owners to withdraw their capital and seek more advantageous opportunities for profit elsewhere. Only if the current capacity of the industry is exactly what is desired by the regulatory and reimbursement authority does the sole consideration of the costs of capital become consistent with or make sense in a cost-related reimbursement scheme.

Even though this central problem exists, the idea that a cost-based reimbursement method could be fundamentally incompatible with the goals of reimbursement authorities has been little recognized and seldom discussed. Yet the logic of the situation is inescapable. If government authorities desire the industry to do anything other than remain at its current size, then the reimbursement of capital must be at some rate other than the current cost of the capital to the nursing home entrepreneur.

A second aspect of the rate of return and role of profit or loss relates to the incentives from increased productivity and efficiency in the use of resources. An excess of revenues over costs of all resources in the firm ordinarily accrues to the entrepreneur and equity capital owners. Thus there are incentives for the entrepreneur to be cost-saving and efficient in the use of resources, always seeking the combination and level of resource use, the new technology and method of organization or production, and the lowest prices for the chosen resources that will maximize the positive difference between total revenue and total costs. However, if nursing homes are reimbursed only on the basis of their costs, no opportunity for profit is allowed. Such a scheme of reimbursement is an open invitation to excesses in resource use, and clearly denies society the opportunity to obtain increased productivity and efficiency from the creativity and inventiveness of a major health care industry.

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[2] A "fair" rate of return to capital is the opportunity costs of capital resources. This represents a payment sufficient to induce the owner to part with the services of the capital, and thus is what the owner could have received from competing buyers in the market. "Profit" is a payment in excess of, or a "loss" is an amount less than the opportunity costs of capital. In the latter case, the payment to capital owners may be greater than zero in the accounting records of the firm.

2. Risk and Reimbursing the Costs of Capital

The issue of investment risk also poses conceptual difficulties for cost-related reimbursement plans. Although the U.S. Supreme Court has declared that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risk," [30], and economic theory implies that increased compensation will be required for investors to incur additional risk, it is far from clear just exactly how risk should be incorporated in a cost-related reimbursement system.

The first key point is an understanding of the nature of risk. In a competitive market, assets earn premium rates of return as a function of non-diversifiable risk only, not as a function of total or overall risk. It is the covariance of the return to a particular investment with the return of an efficient market portfolio that defines an asset's risk, and not the overall variability of the return to the particular investment.

Second, presumably reimbursement authorities wish to pay only those returns that would be made in an open market. However, many, perhaps most, nursing home owners do not possess diversified investment portfolios. They own instead a single asset--the nursing home--which can be a much riskier portfolio than a diversified portfiolio. In the open investment market, these nursing home owners would be forced to bear the added unsystematic diversifiable risk of their single asset portfolio; it is the "penalty" for failing to diversify efficiently. It is not clear, however, that this is the intent behind cost reimbursement of the costs of capital, nor for that matter, that such a meaning was incorporated in the *Hope* decision.[3]

C. Some Practical Problems

There are significant practical difficulties attached to cost-related reimbursement which this research has reaffirmed and pointed out. We consider first administrative issues; and second, the incentives created by cost-related reimbursement.

1. Administrative Issues: Reporting, Monitoring, Policing

This project collected and examined over 3000 cost reports from individual facilities in four states. We did no auditing or checking of data, only tabulation of the information by a uniform format. Even a brief review of the efforts described in Appendix B to develop comparable statistics across facilities and states will indicate the extensive administrative difficulties in obtaining reasonably accurate information.

Obviously in order to reimburse on the basis of costs it is necessary to know explicitly what those costs are. This requires the collection of cost and other statistical data from each nursing home firm and for each facility. The reporting task in itself is monumental as reports must be obtained from 18,000 or more separate, small and diverse nursing homes each year, or even at more frequent intervals as now occurs in some states. Unless the data are assembled in a uniform manner, there is no certainty that comparability has been attained, and inequities in reimbursement develop across facilities within a state, and most certainly across states as different systems of reporting are adopted in the various states.

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[3] One of the implications of the economic efficiency of investment diversification is the trend toward the corporate form of ownership. Unless there is a specific policy of subsidizing non-corporate nursing homes relative to homes owned by corporations, this trend will probably continue. However, a policy of subsidizing proprietorships and partnerships would effectively penalize entrepreneurs who were trying to achieve an efficient and diversified investment portfolio. This type of decision by reimbursement authorities would alter the industry structure from what it otherwise would be and result in further deviation from efficient behavior.

However, perhaps more importantly, there are frequent opportunities for manipulation of reports, records and accounting data. The difficulties in identifying ownership of capital, for example, are evident. The reporting institution, furthermore, has a clear incentive to report false and inaccurate information. Accordingly, a cost-related reimbursement scheme requires that cost reports be reviewed for accuracy, and that the accounting records from which they are drawn be audited.

A serious monitoring effort under cost-related reimbursement can be conducted only with the aid of substantial numbers of well paid individuals. Anything less than a thorough monitoring effort will suffer substantial loss of effectiveness, since entrepreneurs with a great deal at stake confront less well trained and overworked auditors for whom a specific case is but one of many to be handled within some time limit. A reimbursement system which requires the collection, compilation, review and audit of mountains of cost data from literally thousands of small firms will be a very costly system administratively and at the same time may fail to be effective at cost containment.[4]

Furthermore, the attempt to control the behavior of the nursing home entrepreneur has logically led to more and more detailed regulations as the government's involvement has increased under cost-related reimbursement. This increase in regulations not only restricts the choices that nursing home operators may make regarding resource allocation, but encourages the industry to deviate further into economically indefensible use of resources. (See next section.) An efficient authority would attempt to recognize, understand, monitor and redirect the potential perverse incentives of cost-related reimbursement as they occur. But this requires a large and highly skilled staff with substantial training in the economics of the situation. Aside from the issue of what the costs of such a staff would entail for effective policing of nursing home resource allocation decisions, there is the initial issue of where to obtain such a staff. Regulatory authorities have historically been unable to attract and keep individuals of the required caliber because such work often is viewed as professionally unrewarding at prevailing government salary levels. Problems both in obtaining high quality staff and in funding the monitoring activities adversely affect the effectiveness of controlling nursing home entrepreneurial behavior and/or eliminating serious inefficiency in the use of resources under a cost-related reimbursement system.[5]

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[4] The Medicaid agency in Washington State recently came under heavy attack from legislators as well as industry representatives for being over two years behind in reviewing and auditing cost reports. At the same time there was some evidence that more payments were made than were required under properly audited conditions. The Medicaid agency was clearly understaffed to accomplish fully the monitoring and auditing function.

2. Cost-Related Reimbursement System Incentives

It is the creation of incentives for inefficient behavior of nursing home entrepreneurs which are most frequent and least likely to be recognized in a cost-related reimbursement system. We have already called attention to some of these problems in this report. Reimbursement of debt capital "at cost," for example, removes any incentive for the entrepreneurs to search for low cost funds. Indeed, this reimbursement practice creates the incentives to collude with lenders to borrow at artificially high rates of interest. In addition, the use of unadjusted historical costs of assets (book values), for estimating depreciation allowances, and for determining the return to capital leads to substantial divergence between payments under cost-related reimbursement and the real cost of capital. Such practices encourage "trafficking" in nursing homes, i.e., the frequent sale and resale of the same home, or sale and lease-back arrangements among affiliated organizations and other similar transactions. Such actions amplify and compound the problems associated with the monitoring and policing of nursing homes to avoid fraud and noncompliance with cost-based regulations. Finally, it should again be emphasized that cost-related reimbursement encourages no cost-saving innovation, or technological change that could be cost-reducing and more efficient in the use of resources. Since the entrepreneur fails to share in any cost savings, the normal market incentives for innovation, experimentation, and increased productivity are absent.

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[5] It should not be overlooked that the behavior of nursing home entrepreneurs which is a response to perverse incentives built into cost-related reimbursement systems has been characterized as "antisocial," "rip-off," "profiteering from the poor and unfortunate," and similar expressions. These expressions merely create an antagonistic and politically volatile situation between the regulated and the regulators, and do nothing to alter the perverse incentives.

Reimbursement authorities have indeed attempted to cope with some of the perverse incentives of cost-related reimbursement. Provisions in reimbursement plans have been introduced to set limits on interest, describe allowed depreciation methods, and regulate non-armslength transactions, among others. The proliferation of these components of cost-based reimbursement schemes, even though the intuitive arguments predicted desired results, for the most part have failed to make much difference, as our analysis in Part II suggests. Nursing home entrepreneurs have numer-ways in which to evade, avoid, or substantially ameliorate the effects of a new reimbursement regulation.

Rather than trying to monitor and control the behavior of over 18,000 individual nursing home facilities, perhaps attention should be directed to the design of a payment for nursing home services system in which incentives for the efficient use of resources are built into the system. There would then be no need for the expensive, if not impossible, monitoring and control of the nursing home industry.

D. Summary

The above discussion raises serious issues with the current systems of cost-related reimbursement. Not only are there important conceptual problems with cost-related reimbursement, especially with respect to the costs of capital, but also several practical issues cannot be ignored. The regulation, administration, monitoring, auditing and control of the 18,000 or more small firms is a monumental and costly process. In addition, there appears to be substantial economic inefficiency built into a cost-related system in the form of perverse incentives for nursing home entrepreneurs.

We are cognizant of the current law and federal mandate for the states to develop and implement reasonable cost-related reimbursement in the long-term care industry. Even though the burden of this section has been to question the effectiveness and applicability of cost-related reimbursement systems, there are some improvements that can be made which have been suggested by this research. In the following two sections, we first propose some modifications of cost-related reimbursement in the nursing home industry, and second, suggest some issues for further research on the reimbursement of nursing home care.

IV. PROPOSED MODIFICATIONS TO COST-RELATED REIMBURSEMENT

Within the framework of a cost-related reimbursement system, regulations must, in our judgment, work with market forces, not against them. Nursing home entrepreneurs will predictably use the resources and operating arrangement which assures the best return for their investment. A reimbursement and regulatory scheme which uses these market incentives effectively is more likely to realize desired policy goals, and at the same time, to assure an efficient use of resources. Consistent with this general principle, we propose the following specific modifications to cost-related reimbursement systems.

1. Estimated facility capital costs should be used as a base for establishing a reimbursement rate which is above or below total costs, according to whether the industry should grow or contract.

Reimbursement authorities should prospectively set a rate per patient day based on the facility's estimated total costs, including capital costs, and permit the facility to earn whatever ex post rate of return it can, given that reimbursement rate. Nursing home entrepreneurs should be allowed the opportunity to receive more and the risk to receive less than the cost of capital. This practice is fully consistent with market forces and can be adopted within the framework of a cost-related reimbursement system.

Reimbursement rates are the prices of nursing home services. In an unregulated market, price rises as demand increases, and firms are afforded the opportunity to earn a return on their investment greater than that rate of return equal to the cost of currently employed capital. However, no specific rate of return is guaranteed. Similarly, in the regulated market, when growth is justified by increased demand, reimbursement rates must be adjusted in order to provide the opportunity for an increase in the return to capital in excess of the current cost of capital. But no rate of return is guaranteed. In both the open and the regulated markets it is the opportunity to earn a return on capital greater than the return which can be earned elsewhere under comparable risk conditions which stimulates the growth of the industry.[6]

The adjustment in rates for growth can be effected within a cost-related reimbursement system. Although the methods for estimating the real costs of capital are imperfect, as we discussed at length in Part III of this report, those estimates can constitute the base to which an amount is added as a "growth" factor for each facility, and accordingly, as an adjustment to the reimbursement rates.

The amount of the adjustment in the reimbursement rate necessary to bring forth a given rate of growth (or contraction) in the industry's capacity will not be precisely known. In a market, the entrepreneur responds to the price increase arising from an increased demand, but in the regulated market, the reimbursement rate does not rise without an administrative decision. Accordingly, alternative signals will be required in order to determine when demand has increased and growth should take place. Examples of such signals include the level of occupancy rates in facilities, the relative difficulties in placing patients, the hospital census of patients eligible for discharge to a nursing home, whether private patients are replacing public patients in nursing homes, and, indeed, what is happening to the rates charged for private patients.[8]

Finally, specific provision in cost-related reimbursement should be made to allow ex post rates of return on capital to reflect cost savings from increased efficiency of resource use. Where economies can be made without reducing the quality of the services provided, the nursing home entrepreneur should be allowed to retain those savings. These funds add to the returns on capital and encourage that entrepreneur to grow and to replace the less efficient nursing home.[9]

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[6] Conversely, if the demand for nursing home services should decline, or for policy reasons the present capacity of the industry should be reduced, then the reimbursement rate is set to yield a return to capital less than its present costs.

[7] We discuss estimates of real costs of capital below.

[8] Some of these signals are discussed in greater detail in McCaffree, et al., [63]. We note many of these signals may be seriously distorted by a certificate of need law that effectively limits entry of new firms.

2. The real costs of capital should be estimated and used in the determination of reimbursement rates rather than relying on book (historical) costs of capital.

The decisions of nursing home entrepreneurs in the market are based on real rates of return, not book rates of return. If reimbursement authorities are to affect investment decisions and to control the rate of growth of the industry, payments to capital resources must be based on the real value of capital. The incidence of non-arms length sale-leaseback arrangements, which complicate the monitoring and policing of nursing home activity for fraud and noncompliance with reimbursement regulations, occurs because of the use of book, rather than real, capital values by reimbursement authorities. Similarly, the practice of trafficking in nursing homes can be explained by the divergence of book values and real capital values, and is encouraged where Medicaid reimbursement for nursing home care is based on accounting records and book values.

Adjusting the book value of capital for depreciation and inflation appears to reflect more closely the real capital values in the nursing home industry. Real depreciation is generally less than accounting depreciation, which is encouraged by laws which provide incentives for depreciating assets over period of time much shorter than the real productive life of most assets. Further increases in asset prices from inflation are also not reflected in the books of the firm, and lead to book capital values lower than real capital values. Adjusting asset values for inflation will increase book values and bring them more in line with real capital values.

Of course, no one can determine precisely what is the real capital value. For example, even the above adjustments do not account for changes in asset values brought about by changes in relative demands. Reimbursement authorities must work only with accounting data and book values.

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[9] We return to this issue below in discussing a more specific capital reimbursement proposal.

However, the proposal to adjust asset and book values for inflation and for the effects of traditional accounting practices will enable the reimbursement authorities to approximate more closely the decision pattern of the nursing home entrepreneur and to obtain more effectively the desired behavior from the industry.

3. The reimbursement for capital services requires no special premium on the rate of return for riskiness of investment in the nursing home industry.

Although our findings were unable to determine whether, or to what extent government regulation per se has affected risk, the consistent and statistically significant results obtained across several groups of nursing home firms affirms that investment in nursing homes is less risky than for investment in the market as a whole. There are factors which may act to increase risk in the nursing home industry, such as the uncertainty of political decision making and the vagaries associated with frequent revisions in the reimbursement regulations. There are also counterbalancing factors that reduce riskiness. Nursing homes face a certainty of a steadily rising demand for nursing home services from an aging population. Government regulation, furthermore, provides nursing homes with protection against new entry, protection against default of payment, and political and legal recourse to higher payments. On balance, the results of our analysis support the conclusion and the proposal that no premium should be incorporated in the rate of return by reason of the riskiness of investment in the nursing home industry.[10]

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[10] We note again a point referred to earlier: the current trend towards incorporation and towards publicly held corporations may represent an attempt by nursing home investors to reduce risk by holding more diversified investment portfolios, rather than an attempt to increase the rate of return per se.

4. Estimation of capital costs should be based on total assets, rather than separate computations of costs for debt and equity.

The capital assets used to produce nursing home services are physically indistinguishable whether debt or equity financed. The cost of the capital services can be measured by the rental payment that would have to be made in an open market if those capital assets were leased rather than owned. Thus, the reimbursement of capital resources should be centered on the determination of a rental price for the real assets of the facility. We believe either an explicit rental, estimated from the market for leased capital assets, or an implicit rental price, estimated by imputing current values to the assets and a current rate of return, can be used to simplify the reimbursement of capital resources.

(i) A rental price for capital assets: an explicit rental price for nursing home assets depends upon a market for leased capital assets. Assets similar to and in some cases identical to those in nursing homes, however, are regularly leased. Rents could be set annually, or as often as necessary, using market surveys in the same manner as wage levels are frequently determined. In this procedure the age, condition, location, and other characteristics of the assets could be taken into account as are age, education, and experience in the labor force, and a rental price arrived at as a basis for the rent of the capital assets used in a nursing home.[11]

In the absence of a well defined market of leased assets comparable to those in a nursing home, an implicit rental price would have to be estimated. Market values, such as those reflected in the explicit rental price, must, however, be effectively incorporated in the estimated implicit rental price. Rent should be a current market price. Accordingly, the underlying asset values must be estimates of current market values, reflecting adjustments for the deficiencies of accounting practices, for general inflation and for changes in the relative demand for nursing home capital as discussed in Part III. In addition, a rate of return applicable to these adjusted book values of all assets in the nursing home must be selected in order to determine the rental payment. This rate of return could be some multiple of the interest rate on bonds in the Federal Hospital Insurance Trust Fund, the rate of return from a diversified portfolio of the national securities traded on stock exchange, the mortgage interest rate for commercial loans under $1 million, or some composite of such rates.[12]

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[11] Reliance on a leased-capital market should be effective. Only a relatively small number of services provided in a nursing home are unique (administration of drugs, therapies for disabled residents, and similar medical services): 80-90 percent of the services are comparable to those provided in a hotel, boarding home, or retirement home. The purpose of capital is primarily to produce space. Some equipment is nominally for special purposes in nursing homes, but overall capital uses compete closely with those in other industries. Furthermore, some nursing home facilities are rented at arms-length, and these rental agreements provide direct comparisons for assets in nearby and similar nursing homes.

Either the explicit or the implicit rental price for nursing home assets used as the benchmark for calculating the reimbursement rate should be set prospectively on the basis of values prevailing at the beginning of the year. What happens in the rental, financial, or capital markets during the year, as well as what actions the nursing home entrepreneur takes during the same period, will indeed determine whether the nursing home makes a profit or incurs a loss. But this is as it should be. The owner should be knowledgeable about developments in these markets in order to make intelligent decisions, and he must be given an opportunity to demonstrate a competence that is rewarded by profit, or to display a lack of entrepreneurship that results in a loss.

(ii) Advantages of the rental price method: the rental price method of reimbursing for capital assets as a whole has several significant advantages, not the least of which is providing more appropriate incentives than itemized payments for depreciation, interest on debt, and a return for equity capital for the use of such resources in supplying nursing home services. The use of a rental price for all assets encourages the nursing home owner to make the most advantageous financing arrangement. If a firm has borrowed at a high interest rate, and the current market mortgage rate falls, the owner has an immediate incentive to refinance; the failure to do so reduces the return on his equity capital and may result in losses. Further, the entrepreneur under ordinary borrowing circumstances will have an incentive to find capital funds at the lowest interest rate, rather than the incentive to accept what is most convenient or even collude with lenders on inflated interest charges that are a "pass through" under cost-related reimbursement plans currently in use. In addition, if an owner is known to be an efficient manager, under the rental price arrangement lenders may even be willing to provide funds at a lower interest rate than to other borrowers in the current market. The efficient manager will thus be rewarded under the proposed capital rental price reimbursement scheme.

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[12] We have described such a scheme elsewhere [62].

A rental system also allows the owner/entrepreneur to choose the mix of debt and equity financing considered optimal, and thus to take into account the relative risk associated with investment in the nursing home in the form of debt or equity capital. Either under an implicit or an explicit rental price, nursing home entrepreneurs, whether lessors, facility administrator/lessees, partners, or stockholders, can expect to receive equal treatment according to the capital resources employed.

In addition, the use of a rental price eliminates concern over such questions as who owns what and whether nursing home sales are made and to whom. The determination of the rental price for assets as a whole circumvents most of the reporting, reviewing of records, and auditing concerned with the legitimacy of mortgages, notes, lease arrangements among affiliated organizations, reasonableness of the interest payments, the amount of and rate of return on equity capital, the amount of depreciation, and so forth. Furthermore, the rental price for all assets in the nursing home can allow different forms of business organizations and/or capital asset financing arrangements to exist, grow or disappear in the competition of the capital market.

(iii) Remaining problems of economic efficiency: although there is reason to believe that the rental price is likely to allocate capital resources more efficiently than reasonable cost-related reimbursement as currently carried out, such a payment arrangement does not necessarily assure the efficient use of all resources in the production of nursing home services. In the first place, no account is taken in this payment plan nor in present cost-related reimbursement plans on how asset maintenance expenses are related to the costs of capital. Entrepreneurs can determine the length of life of an asset by selecting the real rate of depreciation. Facility owners, for example, may decide to do substantial maintenance, to charge large amounts for this maintenance, prolong the life of the building, and thus increase the real value of the facility. The government could therefore potentially pay both the maintenance expenses and subsequently pay a higher rental price because the facility had been "over-maintained."

Every regulatory and reimbursement plan is also concerned with the size of the rate base and the quantity of capital employed. As was noted in Part III, the character and behavior of nonprofit nursing home facilities may have led to overcapitalization, and potentially to higher costs per patient day of nursing home care. This may become a general issue with cost-related reimbursement, even with a rental price for capital. The issue is, for example, how much total land, building space and equipment per bed should be allowed in a newly constructed facility. Unless standards of what is an adequate quantity of capital per bed are set, there may be no effective way to avoid the construction of the "marble palace" where rent costs per patient, or other capital reimbursement, steadily increase over time.

5. The cost-related reimbursement system should incorporate general regulatory provisions where nursing home compliance can be readily determined by simple and objective criteria.

The effectiveness of cost-related reimbursement can be improved by the use of general, rather than narrowly defined and specific regulations, and especially where compliance by the nursing home can be readily determined. We note particularly that those components of cost-based reimbursement which affected industry growth rates significantly were total (per diem) payment limits, and the minimum occupancy rate regulation. The former illustrates the case of a broad provision in contrast to limits on various cost centers, such as limits on interest expense, specification of allowed depreciation method, and so forth. In the latter cases, nursing homes have opportunities of evading cost limits on specific cost centers by transferring expenditures from one center to another, but are unable to do so on an overall per diem cost ceiling. Furthermore, the total payment limit is a discernible target, fully within the control of the regulatory authority and one where compliance by the nursing home can be readily determined to have occurred. It represents the maximum allowed payment for nursing home services. Furthermore, in the case of a minimum occupancy rate regulation, compliance with the regulation is readily determined. Whether the nursing home reaches the minimum occupancy level over which fixed costs are to be allocated to a per patient day rate can be easily ascertained.

V. SUMMARY AND CONCLUSION

In this project, we have examined several issues related to profits, rates of return, growth in beds and the reimbursement of the providers of care in the nursing home industry. Four largely empirical analyses were undertaken on these issues, which not only provided new data and new information on the impact of reimbursement policy on nursing homes, but also have led to our reexamination of the basic assumptions underlying the use of cost-related reimbursement in the long-term care industry. Our research has also been aided by discussion with representatives of both state reimbursement authorities and the industry.

The major conclusions and findings in Section II, above, provide summary answers to the four general questions for research which were posed in Part I of this report. This research was aimed at obtaining answers to questions on (1) the relationships of profits, growth and components of the nursing home reimbursement systems, (2) the computation of rates of return to capital under reimbursement systems, (3) the risk of investment in the nursing home industry, and (4) the influence of integration on profitability of nursing homes. In addition, these conclusions and findings, as well as our discussions with parties involved in reimbursement plans, led to a reevaluation and critique of cost-related reimbursement. This examination led us to question seriously the idea that cost-related reimbursement is the best way to achieve public goals for the long-term care industry. Section III above contains some of the reasons behind this conclusion.

Although we question the effectiveness and applicability of cost-related reimbursement systems, we are aware of the political realities regarding present reimbursement policy and the practical necessity, in the short run, of accommodating to what the law currently provides for the nursing home industry. Within the framework of cost-related reimbursement it is still possible to make modifications to reimbursement policies which will improve the efficacy of such systems by making them easier to administer or by removing some of the perverse incentives inherent in some reimbursement schemes. In Section IV, above, we have set forth some changes, along these lines, encouraging especially more extensive use of market information.

The research in this project has also indicated several issues in which further research and analysis would be of assistance to the formulation of policy. These issues fall into two categories. First, there are those which are of a more immediate concern and have implications more directly related to cost-related reimbursement. The second group of issues deal with the longer run.

In the category of immediately relevant questions, we would suggest the following.

(i) What is the "minimal" set of facility characteristics and market conditions which require monitoring in order effectively to enforce a cost-related reimbursement system?

We have emphasized the administrative and cost monitoring aspects of cost-related reimbursement. Every additional cost item reviewed, audited, or monitored represents a further dilution of monitoring resources, and each additional regulation requires additional effort to assure compliance by the industry. These costs must be weighed against the potential gains to the government of monitoring each additional effort. A guiding principle might well be that "the more complicated the system, the more likely the system is unenforceable." With these considerations in mind, it would be worthwhile to try to define the smallest set of items which Medicaid agencies can monitor, still preserve the system, and achieve the major goals of public policy in long-term care.

(ii) What is the relationship between real rates of depreciation and the amount of maintenance expenses?

Nursing home entrepreneurs are able to prolong the length of life of assets and increase their values by means of maintenance expenditures. When such expenditures are treated as current operating expenses, this practice may lead to payments by the government for both added investment, and subsequent higher rentals because of the resulting higher values of the assets. The implication of this phenomenon could be examined in relation to the rental payment plan considered above. Some states, including Washington, are considering rental plans where the study of the relationship of depreciation and maintenance expenditures could be readily carried out.

(iii) What are the alternative means of preventing overcapitalization in nursing homes?

There is reason to believe that all nursing home firms will tend to overcapitalize under cost-related reimbursement. In addition, nonprofit nursing homes appear to have greater capital investment per bed than proprietary firms, due perhaps to the absence of a claimant for surpluses. Development of means for avoiding excess capitalization would appear to be a fruitful area for further study.

(iv) What is the relationship between public and private patient rates?

The private patient market could provide useful guidelines for setting appropriate rates for payment for services to public patients, in the absence of a regulated private patient market. Nearly one-third of the residents of nursing homes are private pay patients. As much as 25 percent of the cost of care for public patients comes from retirement benefits including social security and supplemental income payments. Thus the sources of well over 40 percent of the revenues of the long-term care industry are private.

Industry representatives contend that private patients subsidize public patients. If this is true, legislators and others may need to reconsider who is "paying for" the care of public patients. Furthermore, private patient subsidization of public patients would complicate the use of private patient rates as reimbursement rate benchmarks. Such cross-subsidization among patients also raises questions about the extent of competition among firms in the industry.

(v) How competitive is the nursing home industry?
Recommendations to use market price data to a greater degree rely to some extent upon the assumption that the nursing home industry is essentially competitive, and thus that market data are more likely to lead to efficient resource use. There is a strong presumption that the industry is competitive, as we have argued above. However, the extent to which the industry is actually or potentially noncompetitive in the provision of specialized services or in specific geographic areas is important. Furthermore, the extent to which the industry is competitive raises issues regarding how much government regulation would be required in order to reach public goals in the care of the public assistance patients.

Besides these issues of more immediate relevance, there are also longer range research questions which should be addressed. These issues relate primarily to an examination of alternative schemes for the purchase and payment for nursing home services by the government. Specifically:

(i) What are the alternative payment-for-services systems to cost-related reimbursement which would eliminate some of the undersirable features of cost-related reimbursement systems?
Several alternatives to cost-based reimbursement on an individual facility basis, already examined in part by others, are worthy of further research. These include (1) competitive bidding by providers for contracts to provide long-term care for public patients; (2) a purchase on a payment-for-service basis with the reimbursement rate prospectively determined on the basis of estimated private patient rates and uniform across providers

within defined market areas; (3) a flat rate set for groups of providers, which may reflect some average cost across the group of providers or types of patients served, or (4) a scheme whereby government may buy out all homes, and contract for private management services on a bid basis. There are numerous variations of these alternatives, and yet, to our knowledge, they have yet to be examined fully and systematically compared to the current system. Some may be rejected with only a little analysis. Other systems may ease the monitoring and enforcement demands on reimbursement authorities, utilize market forces more effectively to obtain more efficient use of resources, or force the entrepreneur to minimize the cost of producing the desired quantity and quality of product.

Under alternative reimbursement systems, as under cost-related reimbursement, assurance is required that the proper quality of product is being delivered. Another major area of research, which we have reported on only marginally, is quality and its relationship to costs and the reimbursement system. Specifically:

(ii) What quality control specifications are required by alternative payment systems, including cost-related reimbursement schemes?

Any purchaser of goods or services must specify and ensure the quality of the product--this is as true of nursing care services as it is of jet aircraft, shoes, or drugs. In the health care industry the quality of the output is difficult to monitor directly; input quantities can be measured but this is clearly a second-best solution. Cost-based payment systems avoid the problem to some extent at the cost of paying for additional, if not unnecessary, services. A shift to a non-cost-based payment system does require more care in the specification of the product to be obtained. In either case, however, a straightforward and inexpensive system for quality control is required for a well-functioning payment-for-services system. Specification of such a system for long-term care is an area for further research.

There undoubtedly is no perfect payment system for the nursing home industry, nor do we intend to indicate by these suggestions for further research that there is. We do believe, however, that a further examination of alternatives to the current system will prove fruitful. The problems and issues associated with cost-related reimbursement in the long-term care industry are numerous, and sufficiently serious that major modifications of current systems should be considered.

A well designed payment system would enhance the welfare of the over one million residents of nursing homes in this country today. It is our hope that this report will contribute to progress toward that goal.

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PART VIII

APPENDICES

TABLE OF CONTENTS FOR APPENDICES

Page

LIST OF APPENDICES TABLES. A-3

APPENDIX A: NATIONAL STUDY DATA A-11
- A. Dependent Variables. A-13
  - 1. Description of Basic Data Sources. A-14
  - 2. Data Sources Used in the Study A-19
  - 3. Dependent Variable Definitions A-21
- B. Reimbursement Policy Variables A-25
  - 1. Description of Basic Data Sources. A-25
  - 2. Data Construction and Verification A-28
  - 3. Reimbursement Variable Definitions A-30
- C. Control Variables. A-36
- D. References for National Study Data A-44

APPENDIX B: STATE STUDIES DATA. A-49
- A. Collection of Financial Reports. A-51
  - 1. Extent of Data Received. A-51
  - 2. Sampling of New York Facilities. A-53
  - 3. Usability of the Data Received A-53
  - 4. Summary of the Collection of Reports A-55
- B. Coding and Editing of Data A-55
  - 1. Coding and Extraction of Data. A-56
  - 2. Editing of Raw Data. A-56
- C. Verification of the Data A-57
- D. Variable Construction. A-58
- E. Means and Standard Deviation of Data A-70
- F. Coding Forms for States. A-76

APPENDIX C: RISK AND RATES OF RETURN STUDY DATA A-105
- A. Locating and Collecting Data A-107
  - 1. Publicly Traded Nursing Home Corporations. A-107
  - 2. Financial Records. A-114
  - 3. Stock Prices and Dividend Data A-115
  - 4. Market Rates of Return A-123
  - 5. Yield on Risk-Free Assets. A-123
  - 6. Financial Data for Privately Held Nursing Homes. A-127
  - 7. Summary of Data Location and Collection. A-127

Page

B. The Accounting Risk Measures A-129

C. References for Risk and Rate of Return Study Data. A-136

APPENDIX D: VERTICAL AND HORIZONTAL INTEGRATION THEORIES AND STUDY DATA. A-137

A. Hypotheses on Profitability and Integration. A-139

1. Market Power A-139

2. Size of Firm A-140

3. Measurement of Profitability A-141

B. Integration Study Data A-141

C. References for the Vertical and Horizontal Integration Study. A-147

APPENDIX E: SUPPLEMENTAL TABLES AND RESULTS. A-149

A. Introduction A-151

B. National Study Supplemental Tables and Results. A-151

1. Alternative Specifications of Reimbursement Systems. . . A-151

2. Results from Additional Regression Equations A-155

C. State Studies Supplemental Tables. A-206

1. Rates of Return and Facility Characteristics A-206

2. Ownership Status by Type of Ownership. A-206

D. Supplemental Tables for Risk and Rates of Return Study . . . A-209

LIST OF APPENDICES TABLES

Table	Title	Page
A-1	Summary of Data Sources Examined for the National Study	A-15
A-2	A Summary of Dependent Variables, Sources, and Analyses	A-22
A-3	Means and Standard Deviations of the Dependent Variables	A-3
A-4	The Descriptions of State Reimbursement Systems in 1974	A-31
A-5	The Description of State Reimbursement Systems in 1970	A-33
A-6	A Description of State Reimbursement Systems, 1969-73	A-37
A-7	List of Control Variables and Their Data Sources	A-40
A-8	Means and Standard Deviations of Control Variables	A-42
B-1	Summary of Reports Collected from State Agencies	A-52
B-2	Colorado: Step 1 Data Reorganization	A-60
B-3	Georgia: Step 1 Data Reorganization	A-61
B-4	New York: Step 1 Data Reorganization	A-63
B-5	Washington: Step 1 Data Reorganization	A-64
B-6	Construction of Intermediate State Data Variables	A-65
B-7	Construction of Final State Data Variables	A-67

LIST OF TABLES
(continued)

Table | Title | Page

B-8 Means and Standard Deviations of Selected Variables By State and Type of Ownership. A-71

B-9 Means and Standard Deviations of Selected Variables By State and Type of Ownership. A-73

B-10 Means and Standard Deviations for Values of Five Facility Characteristics, By Type of Facility and By State 1971-75. . . . .A-75

C-1 Characteristics of Publicly Held Companies with Nursing Home Operations, 1971-76 . . . . A-110

C-2 Summary of Data Availability for 61 Publicly Held Nursing Home Corporations, 1970-76 . . . . . . A-116

C-3 Raw Financial Data from 10-K Forms for 56 Publicly Traded Nursing Home Firms, 1970-75 . . . . A-118

C-4 Means and Standard Deviations of the Raw Financial Data from SEC 10-K Forms for 56 Publicly Traded Nursing Home Firms 1970-1975. . . A-119

C-5 Average Monthly Quotation Price and Monthly Rate of Return for 49 Publicly Held Nursing Homes 1971-1975 . . . . A-121

C-6 End-of-Month Values of Four Stock Market Indices, By Month, 1971-76. . . . . A-124

C-7 Monthly Rates of Return on 90-Day Treasury Bills 1971-76 . . . . A-128

C-8 Construction, Means and Standard Deviations of Financial Ratios and the Mean Beta Value for 37 Publicly Held Firms 1971-1976. . . . . A-130

C-9 Construction of Financial Ratios for the State Study Sample. A-133

C-10 Means and Standard Deviations of Accounting Variables Used to Estimate the Beta (β) Coefficient of Facilities in Four States 1971-1975 . . . . A-134

C-11 Means and Standard Deviations of Variables Used to Estimate the β Coefficient of Facilities in Four States A-135

LIST OF TABLES
(continued)

Table	Title	Page
D-1	Means and Standard Deviations of Raw Data Variables From Questionnaires to Multifacility Nursing Home Firms, 1974-75.	A-143
D-2	Construction of Final Variables for Integration Study Analyses.	A-145
D-3	Means and Standard Deviations of Final Variables for Integration Study Analyses Among 29 Multifacility Nursing Homes, 1974-75	A-146
E-1	Reimbursement Policy Elements and Principal Component Factor Scores for the First Six Factors	A-154
E-2	Reimbursement Variables Groups By Level of Specificity.	A-156
E-3	Dependent Variables in Tables E-4 Through E-36. .	A-158
E-4	Results of Regression Equations for 1969-73 Change in Bed Capacity and for 1973 Bed Capacity for Proprietary Facilities, All States.	A-160
E-5	Results of Regression Equations for Residuals of the 1969-73 Change in Bed Capacity and for 1973 Bed Capacity for Proprietary Facilities in States with Cost-Related Systems	A-161
E-6	Results of Regression Equations for Residuals of the 1969-73 Change in Bed Capacity and for 1973 Bed Capacity for Proprietary Facilities in States with Flat-Rate Systems.	A-162
E-7	Results of Regression Equations for the Number of Medicaid Certified Beds, By Type of Facility Ownership, 1973	A-164
E-8	Results of Regression Equations for Residuals of the Number of Medicaid Certified Beds for States with Cost-Related Systems, By Type of Ownership, 1973	A-165

LIST OF TABLES
(continued)

Table	Title	Page
E-9	Results of Regression Equations for Residuals of the Number of Medicaid Certified Beds for States with Flat-Rate Systems, By Type of Ownership, 1973	A-166
E-10	Results of Regression Equations for the Number of Medicare Certified Beds, By Type of Facility Ownership, 1973	A-169
E-11	Results of Regression Equations for Residuals of the Number of Medicare Certified Beds for States with Cost-Related Systems, By Type of Ownership, 1973	A-170
E-12	Results of Regression Equations for Residuals of the Number of Medicare Certified Beds for States with Flat-Rate Systems, By Type of Facility Ownership, 1973	A-171
E-13	Results of Regression Equations for the 1969-73 Change in the Number of Medicare Certified Beds, By Type of Facility Ownership	A-173
E-14	Results of Regression Equations for Residuals of the 1969-73 Change in the Number of Medicare Certified Beds for States with Cost-Related Systems, By Type of Facility Ownership	A-174
E-15	Results of Regression Equations for Residuals of the 1969-73 Change in the Number of Medicare Certified Beds for States with Flat-Rate Systems, By Type of Facility Ownership	A-175
E-16	Results of Regression Equations for Residents with Medicaid Funding, By Type of Facility Ownership, 1973	A-177
E-17	Results of Regression Equations for Residuals of Residents with Medicaid Funding for States with Cost-Related Systems, By Type of Facility Ownership, 1973	A-178

LIST OF TABLES
(continued)

Table	Title	Page
E-18	Results of Regression Equations for Residuals of Residents with Medicaid Funding for States with Flat-Rate Systems, By Type of Facility Ownership, 1973	A-179
E-19	Results of Regression Equations for the 1969-73 Change in Quality of Nursing Services, By Category of Facilities	A-182
E-20	Results of Regression Equations for Residuals of the 1969-73 Change in Quality of Nursing Services for States with Cost-Related Systems, By Category of Facilities	A-183
E-21	Results of Regression Equations for Residuals of the 1969-73 Change in Quality of Nursing Services for States with Flat-Rate Systems, By Category of Facilities	A-184
E-22	Results of Regression Equations for Quality of Nursing Services, By Category of Facilities, 1973.	A-185
E-23	Results of Regression Equations for Residuals of Quality of Nursing Services for States with Cost-Related Systems, By Category of Facilities, 1973.	A-186
E-24	Results of Regression Equations for Residuals of Quality of Nursing Services for States with Flat-Rate Systems, By Category of Facilities, 1973	A-187
E-25	Results of Regression Equations for the 1969-73 Change in Average Facility Size, By Type of Facility Ownership	A-190
E-26	Results of Regression Equations for Residuals of the 1969-73 Change in Average Facility Size for States with Cost-Related Systems, By Type of Facility Ownership	A-191
E-27	Results of Regression Equations for Residuals of the 1969-73 Change in Average Facility Size for States with Flat-Rate Systems, By Type of Facility Ownership.	A-192

LIST OF TABLES
(continued)

Table	Title	Page
E-28	Results of Regression Equations for Average Facility Size, By Type of Facility Ownership, 1973.	A-193
E-29	Results of Regression Equations for Residuals of Average Facility Size for States with Cost-Related Systems, By Type of Facility Ownership, 1973.	A-194
E-30	Results of Regression Equations for Residuals of Average Facility Size for States with Flat-Rate Systems, By Type of Facility Ownership, 1973.	A-195
E-31	Results of Regression Equations for 1969-73 Change in the Number of Facilities and for the Number of Facilities in 1973.	A-197
E-32	Results of Regression Equations for Residuals of 1969-73 Change in the Number of Facilities and the Number of Facilities in 1973, for States with Cost-Related Systems.	A-198
E-33	Results of Regression Equations for Residuals of 1969-73 Change in the Number of Facilities and the Number of Facilities in 1973, for States with Flat-Rate Systems	A-199
E-34	Results of Regression Equations for 1969-73 Change in the Ratio of Proprietary to Total Beds and the 1973 Ratio of Proprietary to Total Beds.	A-201
E-35	Results of Regression Equations for Residuals of the 1969-73 Change in the Ratio of Proprietary to Total Beds and the 1973 Ratio of Proprietary to Total Beds for States with Cost-Related Systems.	A-202
E-36	Results of Regression Equations for Residuals of the 1969-73 Change in the Ratio of Proprietary to Total Beds and the 1973 Ratio of Proprietary to Total Beds for States with Flat-Rate Systems	A-203

LIST OF TABLES
(continued)

Table	Title	Page
E-37	Symbols of Explanatory Variables in Tables E-4 Through E-36	A-204
E-38	Adjusted Average Rate of Return for Proprietary Facilities by Above and Below Median Values of Certain Facility Characteristics, by State, 1971-75.	A-205
E-39	Simple Average Adjusted Overall Rates of Return for Corporate and Noncorporate Proprietary Nursing Homes, by Ownership Status of Facilities and by State 1971-75	A-207
E-40	BETA (β) Values, Standard Errors, and Number of Observations for the 12 Multi-Facility Firms Not Included in the Analysis in Part IV.	A-210

APPENDIX A:

NATIONAL STUDY DATA

NATIONAL STUDY DATA

The National Study is an investigation of the effects of the state Medicaid reimbursement policies on several dimensions of growth and quality of care in the nursing home industry. The data for the proposed analyses were not readily available. Accordingly, an extensive search of all known long-term care data sources was required. Considerable effort went into examining data files, especially those that had never been edited by the compiling agency. In the case of many of these sources, data had been compiled for a specific purpose. It was necessary, in those cases, to examine the compiling procedures in order to confirm the usefulness of such data for our purposes. Although this comprehensive data search did not yield every desired variable for each period of interest, it did yield enough information for us to perform most of the basic analyses proposed under the National Study.

The data used in this study were drawn from several sources, since no single source provided all the variables necessary to cover the scope of this study. These data are broken into three groups: (A) the dependent variables, which are the variables whose behavior is to be explained; (B) the reimbursement policy variables, which describe the states' Medicaid reimbursement policies and procedures; and (C) the control variables. For each group we describe the sources of these raw data and how we constructed our variables from the raw data. Since the data are drawn from several sources, questions of comparability and validity are also discussed where appropriate.

A. Dependent Variables

Several data sources were explored to define dependent variables with which to describe the growth in bed capacity by type of care and by type of certification status, the change in quality of care by type of certification, the change in resident sources of funding, and the average size of facilities. The choice and the construction of the dependent variables were determined by the nature of the available data.

Section A begins with a brief description of the potential data sources. The second part of the section is a discussion of why it was necessary to draw information from different data sources to construct some of the dependent variables and of the criteria used to confirm the validity of adopting such a process. The section concludes with a brief description of the five sets of dependent variables used in the analysis.

1. Description of Basic Data Sources

The potential data sources are summarized in Table A-1; the principal sources from this list are described below:

Master Facility Inventory Survey (MFI)[24].[1] This is a biennial census survey of inpatient health care facilities in the United States. The census list of nursing homes for the current survey was prepared by merging the final list of nursing homes from the 1971 MFI survey with the list of new nursing homes gathered by the "Agency Reporting System" [36]. The nursing homes in this survey are classified by type of care into four classes of nursing homes--nursing care homes, personal care homes with nursing, personal care homes, and domiciliary care homes--and are defined as follows:

- Nursing Care Home: An establishment is classified as a nursing care home if (a) one or more registered nurses or licensed practical nurses were employed, and (b) 50 percent or more of the residents received nursing care during the week prior to the survey. (Nursing care is defined as the provision of one or more of the following services: nasal feeding, catheterization, irrigation, oxygen therapy, full bed bath, enema, hypodermic injection, intravenous injection, temperature-pulse-respiration readings, blood pressure reading, application of dressing or bandages, and bowel and bladder retraining.)

- Personal Care Home with Nursing: As establishment is classified as a personal care home with nursing if (a) there was at least one registered or licensed practical nurse on the staff, and some, but less than 50 percent of the residents received nursing care during the week prior to the survey; or (b) some of the residents received nursing care during the week prior to

---

[1] Reference numbers used in this Appendix refer to the references listed at the end of the Appendix.

TABLE A-1

SUMMARY OF DATA SOURCES EXAMINED FOR THE NATIONAL STUDY

Source	Description	Years Data are Available	Availability State Estimates	AVAILABILITY OF NURSING HOME CLASSIFICATIONS: Type of Certification: Medicare	Type of Certification: Medicaid SNF	Type of Certification: Medicaid ICF	Type of Care: Nursing Care	Type of Care: Personal Care: With Nurseing	Type of Care: Personal Care: Without Nurseing	Type of Ownership Proprietary	AVAILABILITY OF NATIONAL STUDY VARIABLES: Beds	Facilities	Residents	Total Employees	RNs	LPNs
NCHS																
1. Master Facilities Inventory (MFI)	National Census of Nursing Homes. Ref. [24], [25], [28]	1967, 1969, 1971, 1973	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. National Nursing Home Survey (NNHS)	Stratified Sample of 1908 facilities, the universe consists of MFI facilities. Ref. [26]	1973, 1974	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. Resident Places Survey (RPS-3)	Stratified Sample of 1854 facilities, the universe consists of MFI facilities. Ref.[27]	1969	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
SSA																
1. Medicare-Medicaid Automated Certification System (MMACS)	Information as reported on applications and questionnaires received; date of data varies by facility. Ref.[33]	1975 1976	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Medicare Publications	Data generated from the Medicare payments mechanism. Ref.[34],[35],[36]	Annual	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes	Yes
SRS																
1. B-4 Reports	Data generated from the Medicaid payments mechanism. Ref. [32]	Annual	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	No
AHCA																
1. Nursing Home Fact Book	Data obtained from state registers of facilities. Ref.[4]	1970	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No
2. Long-Term Care Facts	Data compiled from state registers of facilities. Ref.[1]	1974, 1975	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
3. Survey of Nursing Homes	Survey of state facility registers. Ref.[25]	1969	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
LOHMAN AND LOHMAN																
1. Geriatric Environments	Private survey of state health departments. Ref. [11]	1960, 1965, 1969	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
CONGRESS																
1. National Health Insurance Resource Book	Ultimate data of unknown source. Ref. [18]	1975	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No

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[a] "Reference" refers to the data sources in the reference list in Section D.

practical nurses were on the staff, but one or more of the following conditions were met: medications and treatments were administered in accordance with a physician's orders, supervision over self-administered medications was provided, or three or more personal services were routinely provided.

- Personal Care Home: An establishment is classified as a personal care home if medications and treatments were administered in accordance with a physician's orders or supervision over self-administered medications was provided, and/or three or more of the applicable personal services were routinely provided. This classification applies whether or not registered or licensed practical nurses were employed.
- Domiciliary Care Home: An establishment is classified as a domiciliary care home if the criteria for a nursing care home or personal care home were not met but one or two of the applicable personal services were routinely provided.

The updated MFI survey collects information on characteristics of the facility, patients, services provided, and nursing employees. For purposes of our analysis this source provides data on beds, facilities, residents, and types of employees classified by type of care and by type of ownership. It does not contain information to allow classification of the data by Medicare and Medicaid certification.

Resident Places Survey-3 (RPS-3) [27]. This survey was conducted between June and August 1969, by the Division of Health Resources Statistics in cooperation with the Bureau of the Census. This was a sample survey of nursing and personal care homes that provided care to the aged and infirm in the conterminous United States. The survey collected data about each facility, its administrator, and a sample of its residents and employees. The universe consisted of the 1967 MFI data plus a list of new homes. A two-stage, stratified probability design was employed to select the sample. The first stage stratification was based on the type of care and size of facility. The second stage consisted of taking a sample of the total residents and a sample of the employees in the establishment at the time of the survey. The sample was designed to estimate statistics within 20 percent of their true value at least 95 percent of the time. The survey classified facilities into nursing care and personal care facilities. The definition of personal care facilities, however, is not the same as that used in the MFI surveys. The Resident Places Survey combines the two personal care classifications of the former into a single personal care category.

As a source, RPS-3 provides data on beds, facilities, residents, and total number of employees. It allows classification by type of care and type of ownership. The problem with this source, however, is that the sample was not designed to provide valid estimates for each state. These data can be used only if it can be shown that the state estimates of the variables of interest are reliable.

1973-1974 National Nursing Home Survey (NNHS) [26]. This survey was conducted from August 1973 to April 1974, by the Division of Health Resources Utilization Statistics. It includes only those nursing homes that provide some level of nursing care. The sample was drawn from a universe of all such nursing facilities in the conterminous United States listed in the 1971 MFI plus new facilities that opened in 1972. The survey thus excludes personal care and domiciliary care homes, homes that opened in 1973, and homes whose level of care was upgraded between 1971 and 1973.

A stratified, two-stage probability design was used for sampling. The first stage strata were classified according to both Medicare and Medicaid certification of homes and their bed capacity. The second stage consisted of selecting a sample of residents and a sample of employees from each facility in the survey. An average of 10 residents was sampled per facility [37]. The survey collected data on facility characteristics, type of care provided, facility expenses, residents, and staff. In general, the survey was designed to provide national estimates with relative standard errors of 25 percent or less. It can be used in our analysis only where the reliability of the state estimates of variables of interest can be confirmed. In all other respects, NNHS is the most comprehensive source of data available. Not only does it contain all variables of interest to us, but it is the only source which permits the classification of these variables by Medicare and Medicaid certification status.

Other Sources. The other two useful principal data sources are the SSA Medicare Series (MCS) [34] and the American Nursing Home Association's Nursing Home Fact Book (NHFB) [4]. The former is derived from the

Medicare health insurance master file and from utilization and payment records. It provides information on Medicare recipients and Medicare certified beds and facilities. It does not, however, contain information for classifying these data by type of ownership.

NHFB is based on a privately conducted survey of nursing homes made by the American Health Care Association. It contains information on beds and facilities classified by Medicare and Medicaid certification status. These data are available only for 1970.

In addition to the above, we have consulted a number of sources which appeared promising initially, but which upon closer examination revealed serious flaws.

The Medicare-Medicaid Automated Certification System (MMACS) [33] has a wealth of information but suffers from two serious limitations. First, its time frame is not constant across all facilities or states. The source is designed as a record of certification and changes; consequently, the data on any facility are only as current as the date of the last survey or application received. Sources at the Division of Health Insurance Data of the Social Security Administration indicated that the differences in reporting dates are often a matter of years. The second limitation is that these data have not been edited. Investigation of the MMACS data tapes uncovered glaring inconsistencies. In addition, many of the relevant variables were either not reported or not coded. Again, the Division of Health Insurance Data indicated that this omission was due to the method of construction of the file. In at least two instances large numbers of inconsistent or unverified records were merged into the file. Unless a major editing effort was undertaken, the MMACS data were not otherwise usable for research in this project.

Data published in the National Health Insurance Resource Book [18] seemed, at first, to provide ideal single-point data on the composition issues. However, when the research staff of the Battelle Health Care Study Center contacted the ultimate source, the Health Insurance Studies Division, Office of Research and Statistics, Social Security Administration, denied releasing the information, stating that it was not reliable. Furthermore, the data were not available for years before 1972 and, therefore, the source was of limited use to this study.

Some other sources were consulted but not found useful for our purposes; Lohman [11] contains valuable data, but only through 1969. The American Health Care Association [1] merely reproduced data already published in the MCS, with the exception of certain counts of beds compiled from state licensing agencies. These counts across states, however, are not for the same point in time. Further, the counts do not distinguish between skilled nursing and intermediate beds. Finally, the Social and Rehabilitation Service B-4 Series [31] does not permit comparable counts of publicly and privately funded nursing home patients.

2. Data Sources Used in the Study

There was no simple way to obtain from the above mentioned data sources a desirable set of dependent variables that would achieve the objectives of the National Study. Except for the Master Facilities Inventory surveys, the data sources did not provide consistent longitudinal information. The MFI surveys, on the other hand, did not contain sufficient information to permit classification of nursing homes and their bed capacity by skilled nursing and intermediate care certification or by Medicare and Medicaid certification. Otherwise, MFI survey data are generally of high quality and consistently defined over the years and are the most useful for our purposes. The surveys do not, however, contain information adequate to address questions regarding growth in bed capacity, quality of care classified by type of certification status, or changes in resident sources of funding.

Unfortunately the data that are required to answer the resource questions are not directly available from any other single source. Nevertheless, there are two data sources that do contain certification information; the most comprehensive of these is the National Nursing Home Survey. There are two problems related to the use of these data. First, the survey was designed only to provide reliable national estimates. Since our analysis uses state level data, we must confirm the accuracy of state estimates computed from the survey before the data can be used. Therefore, the relevant NNHS data were subjected to an efficiency test, described below, to determine the number of states for which we could obtain estimates with an acceptable level of accuracy. The second problem is that this one-time survey limited the analysis to a cross section examination rather than to changes over time. The possibility of using the NNHS data in conjuction with other data sources to generate the desired variables at two points in time was found to be infeasible. The availability of Medicare Series data does, however, permit analysis of changes in Medicare certified bed capacity, quality of care, and Medicare funding of residents.

The use of NNHS and RPS-3 data is essential for analysis of some dependent variables in the National Study. The feasibility of using these data depends upon the accuracy of the state estimates of the variables of interest. The accuracy of these estimates can be confirmed by conducting an efficiency test.

Efficiency Test. The purpose of the efficiency test is to find out whether the number of facilities in the NNHS sample for each state is adequate to insure an 80 percent probability that the state estimates generated by the study are within ± .10 of the true value for that state. This is expressed as

$$P_r\ (\hat{p} - P \geq .10) = .20$$

where

P_r = probability

$\hat{p}$ = the estimated ratio or value, and

P = the true proportion or value.

The required sample size of facilities to achieve the stated accuracy criterion can be determined by the following formula:[2]

$$n^* = \frac{\frac{tS^2}{d}}{1 + \frac{1}{N}\ \frac{tS^2}{d}}$$

---

[2] The variables of interest which are subjected to the efficiency test are ratios. Since there is no recognized formula for estimating sample size for ratio estimates, we chose to use the sample size formula for continuous data estimates.

In this formula

t = the t value corresponding to .20 (two tail) significance level;

d = the value of acceptable margin of error, .10;

S = an estimate of the standard deviation of the variable of interest in the state population of nursing facilties;

N = population size; and

n^* = required sample size.

State sample sizes computed according to the above formula are compared with the state sample sizes in the NNHS. If the survey state sample size was greater than, or equal to, the required sample size for that state, the survey data for that state were deemed acceptable for purposes of the proposed analysis of the dependent variable in question. In addition, data for a state rejected under the efficiency test were accepted if the two following conditions were met: (1) the estimated proportion for at least 80 percent of the states is within ±.10 of the national mean, and (2) the estimated proportion for the state under consideration falls with ±.10 of the national mean.

3. Dependent Variable Definitions

The data exploration yielded five sets of dependent variables. These are summarized in Table A-2 together with their sources and the type of analysis to be performed. The construction of these variables is briefly described below.

(i) Bed Capacity by Type of Care. Two variables are defined in this category: (a) the total number of nursing care beds plus personal care with nursing beds in a state, and (b) the total number of such beds in proprietary facilities in a state.

The data on these variables were obtained directly from the MFI surveys [24, 25, 28]. These surveys provide high quality state estimates based on census data for 1968, 1971, and 1973. The variables can be used both for analyses of change over time and for cross-section analyses.

TABLE A-2

A SUMMARY OF DEPENDENT VARIABLES, SOURCES, AND ANALYSES

DEPENDENT VARIABLES FOR THE NATIONAL STUDY	SOURCE	CHANGE ANALYSIS	CROSS SECTION ANALYSIS
(i) Bed Capacity by Type of Care			
1. Number of proprietary nursing care beds and beds with nursing.	MFI	Yes	Yes
2. Total number of nursing care beds and beds with nursing.	MFI	Yes	Yes
(ii) Bed Capacity by Certification Status			
1. Medicare beds in proprietary facilities/total proprietary nursing care beds and beds with nursing.	MCS, MFI	Yes	Yes
2. Medicare beds/total nursing care beds and beds with nursing.	MCS, MFI	Yes	Yes
3. Certified Medicaid SN beds in proprietary facilities/total proprietary nursing care beds and beds with nursing.	NNHS	No	Yes
4. Certified Medicaid SN beds in all facilities/total nursing care beds and beds with nursing.	NNHS	No	Yes
(iii) Quality of Care			
1. Quality index for all proprietary nursing facilities/proprietary beds.	MFI, FAN	Yes	Yes
2. Quality index for all nursing facilities/total beds.	MFI, FAN	Yes	Yes
3. Quality index for all Medicare certified facilities/Medicare beds.	MCS, FAN	Yes	Yes
(iv) Source of Funding			
1. Medicaid residents/total residents in all facilities.	NNHS	No	Yes
2. Medicaid residents/total residents in all proprietary facilities.	NNHS	No	Yes
3. Medicare residents/total residents in all facilities.	NNHS, RPS-3	Yes	Yes
4. Medicare residents/total residents in all proprietary facilities.	NNHS, RPS-3	Yes	Yes
(v) Facilities and Average Bed Capacity			
1. Total number of beds/total number of facilities.	MFI	Yes	Yes
2. Total number of facilities/elderly population.	MFI	Yes	Yes
3. Total number of proprietary beds/total number of proprietary facilities.	MFI	Yes	Yes
4. Total number of proprietary beds/total beds.	MFI	Yes	Yes

for analyses of change over time and for cross section analyses.

(ii) Bed Capacity by Certification Status. There is a total of four variables defined in this category. Each is defined to examine the growth and variation in Medicare and Medicaid bed capacity across states. These dependent variables are (a) two ratios of Medicare and Medicaid beds in proprietary facilities to total proprietary nursing care beds, and (b) two ratios of Medicare and Medicaid beds to total nursing care beds.

The two Medicare variables are based on data from MCS. Since MCS data include no information on type of ownership, the number of Medicare beds in proprietary facilities was estimated by multiplying the total number of Medicare beds by the ratio of proprietary to total facilities in a state. The availability of time series data from MCS allows us both to perform analyses of change over time and to make cross section analyses on the Medicare bed variables.

The two Medicaid veriables are derived from NNHS data. The number of states that can be included in our analyses is somewhat reduced because the data failed to pass the efficiency test in 24 states. An attempt to obtain the Medicaid variables from RPS-3 data was abandoned since the data in more than 30 states failed to pass that test. For this reason only cross section analyses can be performed on the Medicaid variables.

(iii) Quality of Care. Two separate quality of care index variables are defined for (a) all facilities, and (b) all proprietary facilities. These variables are based on data from the MFI. A third quality of care index variable is for all Medicare facilities and is based on MCS data.

The quality of care is measured by an index, constructed from a weighted average of inputs of nursing labor units per occupied bed. Registered nurses (RN) and licensed practical nurses (LPN) are identified as the relevant labor inputs.

The weights for the two inputs are the national mean annual salaries of RN's and LPN's respectively. National average salaries for nurses are available from the American Nursing Association [2, 3].

All three of these quality of care variables can be defined for different points in time and thus can be subject to both change and cross section analysis.

(iv) Source of Funding. Source of funding variables on nursing home residents are defined for both Medicaid and Medicare residents from NNHS and RPS-3. The variables are also defined (a) by total residents in all facilities, and (b) by total residents in all proprietary facilities.

The information on Medicaid residents by state from RPS-3 was rejected because the data from too many states failed to pass the stated criteria of the efficiency test. Accordingly, the variables using Medicaid residents are subject only to cross-section analysis using the NNHS data. The data on Medicare residents, in the case of both classifications of facilities--(a) all facilities, and (b) proprietary facilities--passed the efficiency test for both NNHS and RPS-3. Thus, the Medicare resident variables are subject to both change and cross section analyses.

(v) Facilities and Average Bed Capacity. The four variables on the number of facilities and average bed capacity are based on MFI data. These dependent variables are defined both for all types of facilities and for proprietary facilities. The availability of time series data on these variables permits performance of both change and cross section analyses.

The means and standard deviations of the five sets of dependent variables used in the National Study analyses are summarized in Table A-3. The table also shows both the number of states and the years for which the data are available for each of the dependent variables.

B. Reimbursement Policy Variables

Descriptions of state reimbursement policies are based principally on the Applied Management Sciences "Report on Systems of Reimbursement for Long-Term Care Services" [5], on data from the General Accounting Office [15], and on raw data from Urban Institute Surveys [13]. Information from these sources is validated by and supplemented with data from several other sources, since no single data source was found complete for our purposes. Information from all sources was combined to produce descriptions of the reimbursement systems in all states for 1970 and 1974, and for the systems which were in effect for the longest period in each state between 1969 and 1973. The data sources and the data construction and editing procedures are described below.

1. Description of Basic Data Sources

AMS Study Data. The principal data source for the description of the reimbursement systems in 1974 is the AMS study [5]. This document provides a one-to-ten page description of the reimbursement system in each state as of January 1, 1975. The descriptions are for the reimbursement of skilled nursing care. Comments are made in passing, and with no intention of being systematic, on intermediate care reimbursement in cases where there are differences between the two. Attempts to validate the AMS data through phone discussions with state agencies revealed some errors in the AMS report. It was beyond the scope of this project, however, to collect primary reimbursement data from each state.

Battelle Study Data. The Battelle Health Care Study Center has a set of state procedure manuals and cost reports that were part of an earlier study [6]. In particular, these sources document capital cost reimbursement. The set includes reports from only 21 states and provides a description of reimbursement systems in these states for 1974. For states that were included in these data, this source provides a means to cross-check the AMS data.

TABLE A-3

MEANS AND STANDARD DEVIATIONS OF THE DEPENDENT VARIABLES

VARIABLES	CHANGE				CROSS-SECTION	
	Number of States Available	Mean (Standard Deviation)			Number of States Available	Mean (S.D.) 1973
		1969-1971	1971-1973	1969-1973		
(i) BED CAPACITY BY TYPE OF OWNERSHIP						
1. Number of proprietary nursing care beds and beds with nursing/elderly population.	50	5.483 (5.320)	3.615 (4.993)	9.089 (6.561)	50	39.374 (14.994)
2. Total number of nursing care beds and beds with nursing care/elderly population.	50	10.629 (10.020)	7.157 (7.027)	17.786 (10.135)	50	63.148 (20.887)
(ii) BED CAPACITY BY CERTIFICATION STATUS						
1. Medicare beds in proprietary facilities/total proprietary nursing care beds and beds with nursing care.	50	-.132 (.121)	-.061 (.062)	-.193 (.153)	50	.148 (.116)
2. Medicare beds/total nursing care beds and beds with nursing care.	50	-.164 (.148)	-.074 (.084)	-.238 (.177)	50	.210 (.151)
3. Certified Medicaid SN beds in proprietary facilities/total proprietary nursing care beds and beds with nursing.	0	-	-	-	26	.494 (.323)
4. Certified Medicaid SN beds in all facilities/total nursing care beds and beds with nursing care.	0	-	-	-	30	.426 (.272)
(iii) QUALITY OF CARE						
1. Quality index for all proprietary nursing facilities/proprietary beds.	50	-.023 (.044)	-.004 (.042)	-.027 (.016)	50	.097 (.029)
2. Quality index for all nursing facilities/total beds.	50	.015 (.027)	.001 (.003)	.017 (.029)	50	.098 (.029)
3. Quality index for all Medicare certified facilities/Medicare beds.	50	-.027 (.183)	.058 (.202)	.031 (.130)	50	.280 (.111)
(iv) SOURCE OF FUNDING						
1. Medicaid residents/total residents in all facilities	0	-	-	-	39	.261 (.198)
2. Medicaid residents/total residents in all proprietary facilities.	46	-	-	-	35	.257 (.198)
3. Medicare residents/total residents in all facilities.	46	-	-	.003 (.085)	48	.040 (.044)
4. Medicare residents/total residents in all proprietary facilities.	45	-	-	-.005 (.059)	48	.038 (.043)
(v) FACILITIES AND AVERAGE BED CAPACITY						
1. Total number of beds/total number of facilities.	50	5.731 (6.390)	5.310 (4.308)	12.041 (8.350)	50	52.125 (19.165)
2. Total number of facilities/elderly population.	50	.117 (.187)	-.040 (.100)	.077 (.202)	50	1.139 (.556)
3. Total number of proprietary beds/total number of proprietary facilities.	50	6.707 (6.364)	6.493 (6.462)	13.205 (10.752)	50	57.245 (20.111)
4. Total number of proprietary beds/total beds.	50	-.022 (.057)	-.019 (.034)	-.041 (.064)	50	.629 (.142)

Urban Institute Data. The Urban Institute provided two sources of information [13, 14]. First, preliminary reports for eight of the eleven states in which the Urban Institute studied the supply and demand for nursing homes were made available. In addition, the Institute provided copies of notes prepared by their surveyors on reimbursement policies, rates, eligibility requirements, quality standards, and certificate of need requirements for Medicaid certified facilities in all 50 states. Both Urban Institute sources provide an outline of the reimbursement system in effect in each state from 1963 through 1973.

The Medicare and Medicaid Guide [7]. This Guide, published by the Commerce Clearing House, provides a brief description of the state plans for Medicaid reimbursement. The effective reporting dates vary across states but fall generally within the period 1974 through 1976. The information in the Guide was apparently obtained from single-paragraph descriptions on file with DHEW regional offices. Prior to 1976 federal regulations did not require states to file any exhaustive descriptions of their reimbursement mechanisms, so these descriptions typically contain only minimal information.

General Accounting Office Data. The General Accounting Office, in a report to Congress in 1972 [15], summarized the elements of state reimbursement policies. This report does not provide information on detailed categories of reimbursement elements as does the AMS report, but it does provide information on major elements of reimbursement systems--such as whether or not the reimbursement criteria are identical to Medicare criteria, whether the riembursement system is based on actual cost or reasonable cost, whether or not the reimbursement rate is negotiated, etc. The GAO report is used as a principal source for describing state reimbursement systems during 1970.

SRS Questionnaires. In 1973 the Social and Reahbilitation Service collected information through questionnaires on Medicaid reimbursement rates and summary statements of reimbursement policies. We have acquired copies of the completed questionnaires [30]. The description of Medicaid reimbursement systems on the questionnaires is limited to general descriptions of the system, such as prospective, cost-related, etc.

Finally, brief descriptions of the 1976 Medicaid reimbursement system are contained in a report published by the Subcommittee on Health and the Environment of the House Committee on Interstate and Foreign Commerce [17]. These descriptions were supplemented with documentation on the reimbursement procedures in effect for 1970-73, and obtained through telephoned requests to the Medicaid reimbursement agency in each state. We were able to obtain only limited documentation for this period from 34 states. It was very difficult to identify the appropriate person from whom to obtain this information. Furthermore, the states did not generally keep descriptions of reimbursement systems for that period. Nineteen states sent descriptions of 1976-77 reimbursement systems.

The procedures we adopted to verify the basic data sources and to construct the descriptions of the reimbursement variables are described in the next section.

2. Data Construction and Verification

Using the above data sources, state Medicaid reimbursement systems are defined at three different times. The first, 1974, attempts to identify the state reimbursement systems in effect at the end of our study period. The set relies primarily on the AMS study [5]. The second description of the Medicaid reimbursement systems is the beginning of the study period in 1970. The data for this date are based largely on the information available from the GAO [15]. Finally, a third set of policies was developed which reflects the reimbursement system that was in effect in each state for the longest period between 1969 and 1973. The latter set is a combination of the data from the 1970 and 1974 dates, and relies heavily on the Urban Institute and SRS data for a chronology of policy changes. This third set of data is used in the analysis described in the National Study part of the text.[3]

The verification procedure used on the three basic data sets and the construction of reimbursement variables consisted of the following steps.

(i) Preparing a comprehensive list of variables required to cover the details of the reimbursement systems across states. The development of reimbursement variables was governed by the type of information available from the reimbursement data sources and the need to include all the relevant features of the reimbursement systems. Thus, a final set of variables was used to define the 1974 reimbursement systems and a set of six variables was used to define the 1970 reimbursement systems. The small number of variables for the 1970 reimbursement systems was dictated by the paucity of detailed information for that period. Finally, 12 variables were defined to describe the 1969-74 state reimbursement systems.

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[3] Subsequently, these descriptions are referred to as the 1959-73 Medicaid reimbursement system.

The reimbursement variables are defined as dummy variables that indicate the presence of absence of various features in the reimbursement procedures. It should also be noted that our definitions of policy variables are not always identical to those used in the AMS or other studies. The construction of our variables required "translating," not merely copying the state reimbursement policy descriptions reported in these studies.

(ii) Identifying the discrepancies between the descriptions of state reimbursement systems in other data sources and those contained in the AMS and GAO reports.

(iii) Resolving the discrepancies by reviewing the available information according to the following rules: (a) accept state published information as superior to other information; (b) confirm information with a knowledgeable individual in the state agencies, whenever possible; (c) accept that information which provides the variable that is consistent with other, already validated variables of the reimbursement system; (d) if there is no basis for resolving the conflicting information from two different sources, accept the information from the basic data sources, i.e., AMS or GAO reports.

The three sets of reimbursement variables thus generated are summarized in Tables A-4, A-5, and A-6. These tables contain extensive notes explaining how the uncertainties are handled on a case-by-case besis in generating these data.

3. Reimbursement Variable Definitions

The 20 variables selected to describe the reimbursement systems in Tables A-4 and A-5 are defined below.

1. Negotiated/otherwise: The state agency establishes the reimbursement rate (or the procedure for establishing the rate), basing it on explicit negotiations with facility operators or their representatives.

2. Group rate/otherwise: Reimbursement rates are determined for a class of facilities and are identical for all facilities within that class.

3. Patient care specific rate/otherwise: The reimbursement rate depends upon characteristics of the patinets served or on specific services provided to the patients in a facility.

4. Prospective rate/otherwise: A rate setting process in which the rate for a specific period is determined at the beginning of the period and there is no provision for retroactive adjustment.

5. Medicare criteria/otherwise: The state criteria for determining allowable costs are identical to those of the Medicare Principles of Reimbursement.

6. Return on equity/otherwise: The allowance for compensating capital costs is determined as a percentage of equity capital.

7. Fixed payment per patinet day/otherwise: The allowance for compensating equity capital costs is determined as a fixed dollar amount per patient day.

8. Percentage of costs/otherwise: The allowance for compensating equity capital costs is detemrined as a percentage of some cost base (such as operating costs).

9. Depreciation as allowable cost/otherwise: Depreciation of the stock of capital is treated as an allowable cost (regardless of any specific treatment of capital).

TABLE A-4

THE DESCRIPTIONS OF STATE REIMBURSEMENT SYSTEMS IN 1974[1]

	NEGOTIATED	PROSPECTIVE RATE	GROUP RATE	PATIENT CARE MIX	MEDICARE CRITERIA 2/	RETURN ON EQUITY	PAYMENT PER PATIENT DAY	PERCENT OF COSTS	DEPRECIATION AS ALLOWABLE COSTS	ORIGINAL COST DEPRECIATION BASE	STRAIGHT-LINE ONLY DEPRECIATION	PROPERTY RELATED COST LIMIT	TOTAL PAYMENT LIMIT	OPERATING COST CENTER LIMITS	ADMINISTRATIVE SALARY LIMITS	LIMITS ON INTEREST	ARMS LENGTH REGULATION	OCCUPANCY RATE REGULATION	COST REPORTS COLLECTED	REVIEW AND AUDIT
ALABAMA		X			X	X			X						X		X	X	X	X
ALASKA 3/																				
ARIZONA 3/																				
ARKANSAS 4/	X	X	X	X																
CALIFORNIA		X	X																	
COLORADO		X			X		X		X		X		X		X		X		X	X
CONNECTICUT		X							X	X						X	X		X	
DELAWARE					X	X			X				X				X		X	
FLORIDA 5/					X	X			X				X						X	
GEORGIA 6/						X						X					X	X	X	X
HAWAII					X	X			X										X	X
IDAHO								X	X		X							X	X	X
ILLINOIS		X		X																
INDIANA 7/		X						X	X		X				X			X	X	
IOWA 8/							X		X		X		X		X		X		X	
KANSAS 9/								X	X		X		X						X	X
KENTUCKY					X	X			X										X	
LOUISIANA	X	X	X																	
MAINE						X			X		X				X		X	X	X	X
MARYLAND					X	X			X				X						X	X
MASSACHUSETTS 10/						X			X		X		X		X	X	X	X	X	X
MICHIGAN							X		X		X		X		X			X	X	X
MINNESOTA		X				X			X		X					X		X	X	X
MISSISSIPPI 11/					X	X			X				X						X	X
MISSOURI 12/	X						X		X		X							X	X	X
MONTANA								X	X				X		X		X	X	X	
NEBRASKA	X	X		X									X							
NEVADA							X		X		X	X		X	X				X	X
NEW HAMPSHIRE					X	X			X		X								X	
NEW JERSEY		X				X			X		X		X		X		X	X	X	X
NEW MEXICO						X			X				X		X				X	X
NEW YORK		X				X			X		X		X	X	X	X	X	X	X	X
NORTH CAROLINA						X			X				X		X				X	X
NORTH DAKOTA 13/		X				X			X		X								X	X
OHIO					X	X			X				X						X	X
OKLAHOMA	X	X	X																	
OREGON		X				X			X			X	X		X			X	X	X
PENNSYLVANIA		X	X																	
RHODE ISLAND							X		X		X		X		X			X	X	X
SOUTH CAROLINA 14/		X						X							X				X	X
SOUTH DAKOTA						X			X		X		X				X	X	X	X
TENNESSEE					X	X			X				X						X	X
TEXAS		X	X																X	X
UTAH 15/	X	X	X																	
VERMONT					X	X			X				X		X		X	X	X	X
VIRGINIA 16/					X	X			X	X			X						X	X
WASHINGTON 17/		X	X																	
WEST VIRGINIA									X		X				X		X	X	X	X
WISCONSIN 18/						X			X	X	X	X		X					X	
WYOMING							X		X				X						X	
TOTALS	6	20	8	3	13	24	7	5	36	3	19	4	23	3	13	4	14	17	39	29

Footnotes: TABLE A-4

1/ This data set is based on the AMS(5) report, that source dates the reimbursement policies as of January 1, 1975. This source has been compared with the Urban Institute data(13), (14) and DHEW(30) which provide 1973 data. The Battelle study(6) using 1974 data and the Commerce Clearing House(7) using 1974-1976 data are also used for validation. In addition, various state documents and personal phone conversations are employed where noted.

2/ Medicare criteria require a purchase price depreciation base with an accelerated depreciation method allowed (¶4501); interest expense is to be "necessary and proper" (¶4906); compensation to administrators is to be "reasonable" (¶5575). Costs of services provided by related organizations are not to exceed the cost of such services available elsewhere (¶5675); return on equity is the means whereby capital is compensated (¶5750); finally, cost reports subject to audit are required (¶6325). All references are from (7).

3/ Neither Alaska nor Arizona has Medicaid programs in 1974-1975.

4/ Mr. Pierce of the Medical Care Division of the Arkansas Department of Social Services (501/371-1906) argues that the system is negotiated. This is consistent with Urban (13) and DHEW (20). However, in late 1975 the system apparently became one of reasonable cost; see (13),(17).

5/ Florida is retrospective. This is consistent with the AMS table (their Table 3.1) but not with their text (p.3.24). However, a letter from James F. Morrison, Program Administrator, Florida SES-Medical Services, suggests the system is not prospective.

6/ The Georgia system description of the capital-depreciation elements is the result of meetings with Paul F. Bellows, Director, Division of Administration, Georgia Department of Human Resources.

7/ AMS reports "a maximum profit of 12.4 percent is allowable," but no base is stated (p.3.42). Battelle reports 12 percent of costs.

8/ AMS makes no mention of treatment of capital. Battelle reports $1.25 payment per patient day as a return on investment.

9/ Kansas is coded as reported by AMS. However, Mr. Hawkins (913/296-3981) of the Division of Medical Services of the Kansas Department of Social Welfare, reports that since 1974 the system has been prospective, with cost-center limits on administration, property, room/board, and health care. No corroboration of this could be found.

10/ Massachusetts is coded with a total payment limit due to the response to the Battelle questionnaire (6).

11/ Mississippi had a reasonable cost system with a total payment limit from 1970-1973. In 1974 the state returned to a flat rate. AMS is then correct, given their date. The characteristics coded are from (30) and (14).

12/ T.E. Singleton, Chairman, Bureau of Medical Services, Missouri Department of Social Services (314/751-2500), reports that the AMS data are correct except that the system did not become prospective until July 1, 1976.

13/ Prospective rate structure is coded for North Dakota; however, the 1973 Urban Institute (13) and Commerce Clearing House (7) indicate a retrospective system. A 1977 system document indicates prospective.

14/ South Carolina is coded as giving a percentage of costs as a return on investment; this is consistent with the 1974 Battelle study(6) and the 1976 South Carolina document, "Appendix A: Medicaid Reimbursement Formula".

15/ Mr. Charles Larson (801/533-5038) of the Office of Medical Services, Utah Department of Social Services, reports that Utah's flat rate is negotiated.

16/ A total payment limit is added to the AMS description. It is included in descriptions by Commerce Clearing House(7), October, 1975, and Urban Institute(13).

17/ Washington adopted the method described by AMS in 1974. Before that the system was as coded, see(13),(30).

18/ Wisconsin is coded as collecting cost reports. AMS argues that such reports were received in 1974 but they were unable to ascertain whether the report would be filed annually.

TABLE A-5

THE DESCRIPTION OF STATE REIMBURSEMENT SYSTEMS IN 1970[1]

	NEGOTIATED	PROSPECTIVE RATE	GROUP RATE	PATIENT CARE SPECIFIC RATE	MEDICARE CRITERIA	TOTAL PAYMENT LIMIT
ALABAMA[2]	X	X				
ALASKA[3]						
ARIZONA[3]						
ARKANSAS[4]	X	X	X			
CALIFORNIA						X
COLORADO[5]		X				X
CONNECTICUT			X			
DELAWARE					X	X
FLORIDA		X	X			
GEORGIA[6]	X	X			X	X
HAWAII					X	
IDAHO						X
ILLINOIS		X		X		
INDIANA		X				X
IOWA					X	
KANSAS[7]		X	X			X
KENTUCKY					X	
LOUISIANA	X	X	X			
MAINE[8]						
MARYLAND						X
MASSACHUSETTS[9]						X
MICHIGAN	X	X	X			
MINNESOTA					X	
MISSISSIPPI[10]		X				X
MISSOURI	X	X	X			
MONTANA						
NEBRASKA	X	X		X		X
NEVADA[11]	X	X				X
NEW HAMPSHIRE					X	
NEW JERSEY						X
NEW MEXICO[12]						X
NEW YORK[13]		X				X
NORTH CAROLINA					X	
NORTH DAKOTA		X				X
OHIO		X				X
OKLAHOMA[14]	X	X	X			
OREGON						X
PENNSYLVANIA		X				X
RHODE ISLAND[15]						X
SOUTH CAROLINA[16]					X	X
SOUTH DAKOTA						X
TENNESSEE						X
TEXAS	X	X	X			
UTAH	X	X	X			
VERMONT[17]					X	
VIRGINIA[18]					X	
WASHINGTON[19]		X	X	X		
WEST VIRGINIA					X	
WISCONSIN[20]					X	
WYOMING[21]	X	X	X			
TOTALS	12	23	21	3	13	23

Footnotes: TABLE A-5

1/ These data are obtained from General Accounting Office(15), 1972, p.12, 39-40; and the Urban Institute(13), 1977. Any inconsistency is reported in these notes and the resolution rule employed is given..

2/ The GAO and Urban reports are in complete disagreement. Urban Institute data are employed because their 1972 information is consistent with a letter on file from Jack E. Worthington, Commissioner, Medical Assistance, State of Alabama.

3/ Neither Alaska nor Arizona participated in the Medicaid program in 1970.

4/ The Urban Institute's "negotiated" characterization is consistent with DHEW(30).

5/ The Urban Institute's "prospective" characterization is consistent with comments of Willis LaVance, Executive Officer for Administration, Colorado Department of Social Services.

6/ Georgia is coded as its system existed in 1971, as reported by Paul F. Bellows, Director, Division of Administration, Georgia Department of Human Resources.

7/ The "flat rate" characterization of the Urban Institute is consistent with a telephone discussion with Mr. Hawkins of the Division of Medical Services, Kansas Department of Social Welfare.

8/ The Maine state document "Principles of Reimbursement" (September 18, 1972) is the data source employed. GAO comes nearest in categorizing it. The Urban Institute's description is discounted due to its 1972, 1973 inconsistency with this state document.

9/ In Massachusetts the GAO's "Medicare" description is discounted due to the stated document: "Rules and Regulations Governing the Determination of Individual Rates of Payments to Convalescent and Nursing Homes Under General Laws, Chapter 7, Section 30L," (December 14, 1967) which indicates the system is a state original with a total payment limit.

10/ There is complete disagreement between the Urban and GAO reports. The Urban's characterization is adopted due to its reliability in other states. In 1971 Mississippi changed to a reasonable cost method, according to the Urban Institute. This would be consistent with GAO.

11/ Only GAO data are available for Nevada; however, they are consistent with a state document on file.

12/ The Urban Institute classifies New Mexico as a cost based flat rate. GAO calls it actual costs up to $15. The state is coded consistently with GAO; Urban's flat rate being interpreted as the $15 limit.

13/ The "actual cost" categorization of GAO is discounted as it is inconsistent with DHEW(30) in 1973, AMS(5) in 1975, and a state document (September 2,1971).

14/ The GAO classification of Oklahoma is used because it is one of four states on which the GAO conducted an indepth report.

15/ Urban Institute data are not available for Rhode Island. However, the GAO data are consistent with the state document "Principles of Reimbursement for Skilled Nursing Homes and Intermediate Care Facilities, July 1, 1969 through June 30, 1970." This document supports the "retrospective" categorization.

16/ South Carolina is not consistently categorized by GAO and Urban. The Urban Institute description is adopted as it is consistent in 1973 with the DHEW(30) survey. Medicare with limits is inferred from DHEW.

17/ The Urban Institute's survey form for Vermont was not available. However, the GAO data are consistent with the Urban Institute(14) data.

18/ The Urban Institute's report of a total payment limit in Virginia is discounted since DHEW(30), AMS(5), and CCH(7) make no mention of a limit except that payment cannot exceed Medicare.

19/ "Patient specific" is coded as the Battelle(6) and the GAO studies give indication of such a scheme.

20/ The two principal sources disagree. The Urban preliminary report(14) indicates that the coded version was in place from 1967-1971. However, the state seems to have experimented with several systems over the period 1966-1973.

21/ The AMS version is adopted. The Urban Institute data are discounted as DHEW(30) argues that the rates were expected to be cost based by 1973, but were not. CCH(7), 1974, also considers Wyoming to be a negotiated flat rate scheme.

10. Original cost depreciation base/otherwise: The valuation of capital for use in determining an allowable depreciation cost is based on the original construction cost of the facility.

11. Straight-line depreciation method/otherwise: The state permits only the straight-line depreciation formula to be used to compute allowable depreciation.

12. Property-related cost limit/otherwise: The state groups costs associated with property (e.g., equity capital cost, rent, depreciation, interest, etc.) and specified a maximum for such payments.

13. Total payment limit/otherwise: The state specifies a maximum payment per patient per unit of time. (The Medicare payment is always a maximum and therefore is not construed as such a limit.)

14. Operating cost center limits/otherwise: The state reimbursement system specifies maximum payments for identified categories of costs (e.g., dietary, nursing department, housekeeping, etc.).

15. Administrative salary limits/otherwise: The state limits administrative salaries by specifying a reimbursement ceiling for compensation to the facility administrator.

16. Limits on interest/otherwise: The state specifies explicit ceilings on interest payments.

17. Arms length transaction regulation/otherwise: The state has specific regulations concerning loans, purchases, and/or rental agreements between related individuals or organizations.

18. Occupancy rate regulation/otherwise: The reimbursement rules specify that fixed costs are to be allocated to a per-patient-day rate on the basis of identified occupancy rate that need not be identical with the actual rate for that facility.

19. Cost reports collected/otherwise: The state collects cost information from all facilities at least once a year.

20. Review and audit/otherwise: The state has an established procedure for reviewing and auditing the cost and other data provided by the facility.

The reimbursement variables used in Table A-6 are defined as above. The variables, however, are divided into those applicable to a flat rate reimbursement system or to a system in which the rate is set on a cost-related basis. The fundamental difference in these two systems is the relationship of the cost of care in a facility to the rates paid to the facility. Flat rates are set prospectively for either a group of facilities or for a group of patients requiring similar services, but in neither case is the reimbursement rate paid to the individual facility dependent directly upon the costs of care in that facility. The provider is free, within standards of care imposed by the state, to make decisions regarding input combinations, service modalities, and quality of services provided. In the cost-related system, the rate is determined for individual facilities based on the actual costs incurred in each facility. Variations in the cost-based systems result from (i) which costs are allowed, (ii) how allowable cost amounts are determined, (iii) what maximums are specified on allowed costs, (iv) the procedure adopted for determining allowed profits, and (v) special provisions included to contain costs and discourage manipulation of reported costs.

C. Control Variables

Table A-7 lists the variables used in the National Study to control for factors that cause differences in growth rates across states. All control variables are taken directly from published data. In addition to these control variables, which are included with the independent variables in our equations, we normalize all dependent variables by population over 65 in each state.

Table A-8 summarizes means and standard deviations of the non-dichotomous control variables. Separate values are provided for different points in time and for change over time.

Data used in the control variables shown in Tables A-7 and A-8 have been specified as set forth below.

TABLE A-6

A DESCRIPTION OF STATE REIMBURSEMENT SYSTEMS, 1969-73

STATE	REIMBURSEMENT SYSTEM																	
	FLAT RATE				REASONABLE COST-RELATED RATE													
		NEGOTIATED RATES	GROUP RATES	PATIENT CARE SPECIFIC RATES		PROSPECTIVE	RETURN ON EQUITY	FIXED PROFIT AMOUNT PER DAY	ACCELERATED DEPRECIATION ALLOWED	ORIGINAL COST DEPRECIATION BASE	TOTAL PAYMENT LIMIT	PROPERTY RELATED COST LIMIT	OPERATING COST LIMIT	ADMINISTRATIVE SALARY LIMITS	INTEREST LIMITS	REVIEW AND AUDIT	OCCUPANCY RATE REGULATION	ARMS LENGTH REGULATION
ALABAMA					X	X	X		X					X		X	X	X
ALASKA	2/				2/													
ARIZONA	2/				2/													
ARKANSAS	X	X																
CALIFORNIA 3/	X		X															
COLORADO					X	X		X			X			X		X		X
CONNECTICUT 4/	X		X															
DELAWARE					X		X		X		X							X
FLORIDA 5/	X																	
GEORGIA 6/					X		X					X				X	X	X
HAWAII					X		X		X							X		
IDAHO					X											X	X	
ILLINOIS	X			X														
INDIANA 7/					X	X								X			X	
IOWA 8/					X			X						X				X
KANSAS					X						X					X		
KENTUCKY					X		X		X									
LOUISIANA	X	X																
MAINE					X		X							X		X	X	X
MARYLAND					X		X		X		X					X		
MASSACHUSETTS 9/					X		X				X			X	X	X	X	X
MICHIGAN 10/	X	X																
MINNESOTA					X	X	X								X	X	X	
MISSISSIPPI 11/					X		X		X		X					X		
MISSOURI 12/	X	X																
MONTANA					X				X					X			X	X
NEBRASKA	X	X																
NEVADA					X			X				X	X	X		X		
NEW HAMPSHIRE					X		X											
NEW JERSEY					X	X	X				X			X		X	X	X
NEW MEXICO					X		X		X		X			X		X		
NEW YORK					X	X	X				X		X	X	X	X	X	X
NORTH CAROLINA					X		X		X		X			X		X		
NORTH DAKOTA 13/					X		X				X					X		
OHIO 14/	X																	
OKLAHOMA	X	X																
OREGON					X	X	X		X		X	X		X		X	X	
PENNSYLVANIA	X																	
RHODE ISLAND					X			X			X			X		X	X	
SOUTH CAROLINA 15/					X	X			X		X			X		X		
SOUTH DAKOTA					X		X				X					X	X	X
TENNESSEE					X		X		X		X					X		
TEXAS	X		X															
UTAH	X	X																
VERMONT 16/					X		X		X					X		X	X	X
VIRGINIA 17/					X		X		X	X	X					X		
WASHINGTON 18/	X			X														
WEST VIRGINIA 19/					X		X							X		X	X	X
WISCONSIN					X		X			X		X	X					
WYOMING 20/	X	X																
TOTALS	16 2/	8	3	2	32 2/	8	23	4	14	2	17	4	3	17	3	25	15	13

Footnotes: TABLE A-6

1/. This data set is based on several sources, principally the AMS report (5) and Urban Institute data (13, 14). These and other sources such as DHEW (30), the Battelle study (6), Commerce Clearing House summary of state plans (7), various state documents and personal phone conversations have been used as noted below to describe state reimbursement policies that were in effect during the 1969-73 period.

2/ Neither Alaska nor Arizona had Medicaid programs in the period of study.

3/ California's reimbursement rate is determined by a survey of a sample of the state's participating nursing homes.

4/ Connecticut groups facilities on the basis of a point system; the rate within each group being the average of the average costs of the facilities in the group, see (30).

5/ Florida's reasonable cost system was not implemented until 1974, see (13), (14), (15).

6/ The Georgia system description of the capital-depreciation elements is the result of meetings with Paul F. Bellows, Director, Division of Administration, Georgia Department of Human Resources.

7/ AMS reports "a maximum profit of 12.4 percent is allowable," but no base is stated (p.3.42). Battelle reports 12 percent of costs.

8/ AMS makes no mention of treatment of capital. Battelle reports $1.25 payment per patient day as a return on investment. In addition, Iowa's reported "maximum rate" appears to be nothing more than the Medicare payment, see (13).

9/ Massachusetts is coded with a total payment limit due to the response to the Battelle questionnaire (6).

10/ Michigan did not adopt a reasonable cost-related system until 1974, see (13).

11/ Mississippi had a reasonable cost system with a total payment limit from 1970-73. In 1974 the state returned to a flat rate. The characteristics coded are from (30) and (14).

12/ Missouri did not adopt a reasonable cost-related system until after 1973, see (13) and (30).

13/ North Dakota is coded as having a retrospective system; this is consistent with (13), (7), and (15). Further, the existence of a total payment limit is documented in (13) and (30).

14/ Ohio did not adopt a cost-related system until late 1972, see (13) and (30).

15/ South Carolina is coded as giving a percentage of costs as a return on investment; this is consistent with the 1974 Battelle study (6) and the 1976 South Carolina document "Appendix A: Medicaid Reimbursement Formula." Further, while AMS reports depreciation as "no mention made," their discussion of "cost reports as prepared for Medicare must be submitted..." (AMS (5) p.3.136) suggests that accelerated depreciation using a purchase price base is allowed.

16/ The total payment limit is coded for Vermont; this is due to the reports of the Urban Institute (14) which indicate a reasonable cost system without such a limit was in effect until 1972.

17/ A total payment limit is added to the AMS description. It is included in descriptions by Commerce Clearing House (7), October, 1975, and Urban Institute (13).

18/ Washington adopted the method described by AMS in 1974. Before that the system was as coded, see (13), (30).

19/ The treatment of capital in West Virginia is inferred from (30), which characterizes the system as employing Medicare criteria.

20/ Wyoming used the cost-based system described by AMS to determine a flat rate for skilled facilities, see AMS (5), p.3.169, (13), (30).

1. Psychiatric hospital beds include beds in federal and non-federal psychiatric specialty hospitals.

2. Home health expenditures per recipient corresponds to the average cost per case. In addition, the large standard deviation results from an extremely small number of recipients, particularly in the early years.

3. Occupancy rate is calculated as total residents in the state divided by the total number of nursing care and personal care beds. This value will differ from the true state occupancy rate measured as the average occupancy rate of all facilities in the state.

4. Non-white elderly necessarily includes all non-Caucasians; thus Hawaii has by far the largest ratio of nonwhite to total elderly.

5. Per capita income of the elderly is obtained from the 1970 census; as such it is inclusive of dollar transfers but exclusive of nondollar transfers. Given the nature of this population income measured in this manner, it is likely to be significantly larger than per capita income exclusive of all transfers.

6. Annual salary of registered nurses is computed as the arithmetic mean of the minimum and maximum values reported by the American Nurses' Association.

7. Medicare and Medicaid expenditures per recipient variables are analogous to expenditure per case. However, since the recipient counts are "unduplicated" this is an overestimate of the expenditure per admission.

8. Life expectancy is computed for all races and both sexes over the period 1969 to 1971.

9. Certificate of need is a dummy variable taking the value "1" if the state had certificate of need legislation, applicable to nursing homes, enacted before 1973; "0" otherwise.

10. Staffing requirements beyond Medicare regulations is a dummy variable taking the value "1" if the state's licensure requirements for skilled nursing care exceed those for Medicare, and "0" otherwise. Medicare requires one registered nurse on duty during the day shift and at least an RN or licensed practical nurse on each of the other shifts.

TABLE A-7

LIST OF CONTROL VARIABLES AND THEIR DATA SOURCES

Control Variable	Symbol	Data Source and Reference
State population of residents in mental institutions, 1969-1973	MRT	
(a) Elderly mental hospital residents		National Institute of Mental Health [29]
(b) Elderly Population		Bureau of the Census [20]
Psychiatric hospital beds per 1000 elderly population	a	
(a) Psychiatric hospital beds		National Center for Health Statistics [24]
(b) Elderly population		Bureau of the Census [20]
Home health expenditures per recipient	a	
(a) Medicaid home health expenditures		Social and Rehabilitation Service [32]
(b) Medicaid home health recipients		Social and Rehabilitation Service [32]
Occupancy rate in 1969	ORT	
(a) Total nursing care and personal care residents		National Center for Health Statistics [24]
(b) Total nursing care and personal care beds		National Center for Health Statistics [24]
Nonproprietary beds per 1000 elderly population	NPBD	
(a) Nonproprietary beds		National Center for Health Statistics [24], [28]
(b) Elderly population		Bureau of the Census [20]
Percentage of elderly nonwhite in the state	PCTNW	
(a) Elderly white population		Bureau of the Census [21]
(b) Elderly population		Bureau of the Census [20]

TABLE A-7

LIST OF CONTROL VARIABLES AND THEIR DATA SOURCES (Continued)

Control Variable	Symbol	Data Source and Reference
Average income of the elderly in the state	EINC	
(a) Total elderly income		Bureau of the Census [19]
(b) Elderly population		Bureau of the Census [20]
Registered Nurse's annual salary	a	American Nurses' Association [2, 3]
Percent of state population in SMSA	SMSA	Bureau of the Census [19]
Medicare expenditures per nursing recipient	MREX	Social Security Administration [34]
Medicaid expenditures per skilled nursing recipient	MDEX	Social and Rehabilitation Service [32]
Life expectancy rates	LEX	National Center for Health Statistics [38]
Certificate of Need	CON	Havighurst [8]
Minimum staffing required (beyond Medicare regulations)	MSR	National Geriatrics Society [12]
Region (South)	STH	Bureau of the Census [19]
Number of personal care beds without nursing per 1000 elderly	PCB	
(a) Personal care beds without nursing	CHPCB	National Center for Health Statistics [24]
(b) Elderly population		Bureau of the Census [20]

[a] No symbols required, as data not used in computations reported.

TABLE A-8

MEANS AND STANDARD DEVIATIONS OF CONTROL VARIABLES

Variable	1969 Base Year		Change 1969-71		Change 1969-73		1971 Base Year		Change 1971-73		Cross-Section 1973	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
State population of residents in mental institutions per 1000 elderly population	4.756	3.076	-1.108	1.066	-1.948	1.294	3.648	2.779	-.8399	1.125	2.808	2.346
Psychiatric Hospital Beds per 1000 Elderly Population	22.041	9.772	-3.643	2.457	-6.555	5.270	18.398	8.543	-2.912	4.026	15.487	7.147
Home Health Expenditures per Recipient (in 1969 dollars)	120.06	152.83	22.39	123.36	22.23	147.19	142.45	110.52	-.15	77.40	142.30	82.64
Occupancy Rate	.899	.045	.000	.029	.010	.034	.899	.038	.010	.029	.909	.035
Nonproprietary Beds per 1000 Elderly Population	16.289	11.660	5.271	6.396	7.737	6.313	21.560	13.926	2.466	3.040	24.026	14.701
Percentage of elderly nonwhites in the state (1970 only)	.101	.127	-	-	-	-	.101	.127	-	-	.101	.127
Average income of the elderly in the state (1970 only)	2811.36	501.73	-	-	-	- -	2811.36	501.73	-	-	2811.36	501.73

TABLE A-8

MEANS AND STANDARD DEVIATIONS OF CONTROL VARIABLES

(Continued)

Variable	1969 Base Year		Change 1969-71		Change 1969-73		1971 Base Year		Change 1971-73		Cross-Section 1973	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Registered Nurse Salary (1973 Only)	9102.28	1029.41	-	-	-	-	9102.28	1029.41	-	-	9102.28	1029.41
Percent of State Population in SMSA (1970 Only)	53.07	26.18	-	-	-	-	53.07	26.18	-	-	53.07	26.18
Medicare Expenditures per Nursing Recipient (1972 Only)	655.88	183.07	-	-	-	-	655.88	183.07	-	-	655.88	183.07
Medicaid Expenditures per Nursing Recipient (1972 Only)	2136.82	1154.80	-	-	-	-	2136.82	1154.80	-	-	2136.82	1154.80
Number of personal care beds without nursing per 1000 elderly	3.34	2.87	-	-	-2.93	2.87	-	-	-	-	.409	.391
Life expectancy in 1970 (years)	70.92	1.34	-	-	-	-	70.92	1.34	-	-	70.92	1.34

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APPENDIX B:

STATE STUDIES DATA

STATE STUDIES DATA

The estimation of book rates of return in nursing homes in the four selected states required acquisition of a large amount of facility- and firm-specific data from the facilities' annual financial reports. Extracting data in a consistent manner from these reports was a major effort because they vary in format both within and across states. The procedures used are summarized below:

A. Collection of Financial Reports
B. Coding and Editing of Data
C. Verification of Data
D. Construction of Variables

The data obtained are shown in Section E below and the state-by-state codes are listed in Section F.

A. Collection of Financial Reports

The basic source of financial reports was the periodic nursing home facility cost reports/financial statements filed with the state Medicaid reimubrsement agencies in Colorado, Georgia, New York, and Washington. Somewhat different data-gathering procedures were adopted for each state because conditions varied. The important features of the data collection effort are described below.

1. Extent of Data Received

Copies of all 1971-75 nursing home facility cost reports/financial statements on file with the state Medicaid agencies were requested from all states except New York, from which a random sample was collected (to be described below).

Some reports were missing from the files of the state agencies and were not available elsewhere. When the number of reports received is compared with the number of facilities covered under the Medicaid program however, the result shows that in no year were less than 63 percent of all reports in any state received. The number of facility reports received is summarized in Table B-1.

TABLE B-1

SUMMARY OF REPORTS COLLECTED FROM STATE AGENCIES

State	Year	Number of Facilities in the State[a]	Number of Facility Reports Requested	Number of Facility Reports Received	Number of Usable Facility Reports Received
Colorado	1971	191	All	180	153
	1972	193	All	181	158
	1973	187	All	185	157
	1974	186	All	184	159
	1975	184	All	176	154
Georgia	1971	287	All	200	0[c]
	1972	330	All	237	0
	1973	363	All	249	221
	1974	402	All	268	236
	1975	336	All	246	199
New York[b]	1971	637	306	143	134
	1972	588	306	160	151
	1973	609	328	161	149
	1974	641	336	172	149
	1975	569	336	173	150
Washington	1971	347	All	278	237
	1972		-- reports not required --		
	1973	335	All	268	208
	1974	314	All	293	247
	1975	308	All	206	187

[a] These numbers were provided by the state agencies. They include only nursing homes participating in the Medicaid program.

[b] Because of the large number of facilities in New York, a random sample of facility reports was requested.

[c] Reports for 1971 and 1972 in Georgia were not usable because they did not contain income information.

The cost and financial reports in all states except Colorado were long, so only the relevant pages from sections on the income statement, balance sheet, expense statement, description of facility, and patient characteristics were requested from these states. The reports also varied in form from year to year. Accordingly, the report form for each year for each state was examined in order to identify only those pages of the report which provided the needed set of data for the study. Frequently a facility did not submit the cost and financial data on the appropriate state form. In these cases, the information received differed from the requested information. In addition, key information was missing from some reports. The result was that the number of usable reports was less than the number of reports received. The actual number of reports used in this study is reported in Table B-1.

2. Sampling of New York Facilities

The large number of facilities in New York and the size of New York facility reports made the process of obtaining all reports on file with the state agency too costly. Consequently, only a sample was requested from New York. The sample was taken from the list of facilities provided by the New York Medicaid agency. Specifically, a 50-percent sample was drawn from the 1971 list of facilities and was supplemented by a 50-percent sample of the facilities which joined the Medicaid program from 1972-75. There were 336 facilities identified in this process. Only about 50 percent of the reports for these facilities were available however, as is shown in Table B-1.

3. Usability of the Data Received

Not all the reports and data received from the states were usable. As noted above, in some instances the facilities failed to use appropriate forms. As a result, the requested pages from the report forms did not contain the needed information. Other facilities left blanks in the report and failed to provide information required for the proposed analyses. Consequently, anywhere from 5-20 percent of the facility reports received for each year could not be used. The precise number of facility reports that yielded usable and complete information in the case of each state is shown by year in Table B-1. (Reports from Georgia in 1971 and 1972 were not usable because the state agency did not request and obtain income statements. This omission makes it impossible to compute the rates of return.) The facilities for which we have usable reports differ from year to year as seen in Table B-1. The consequences of sample size variation by year are discussed in a later section of this Appendix.

Other problems concerning the facility reports were inconsistent information and missing data. These problems were usually overcome, so the reports were used. A brief description of how these problems were addressed is contained in Section B of this Appendix.

One of the criteria for selecting reports from these four states was the expressed policy of each state that the facility reports were audited. The auditing practices, however, varied widely not only between states but also within each state over time. Below are summaries of each state's auditing practices:

> Colorado. Colorado has a thorough auditing procedure in place from a very early date. The expense reports of every facility were checked every time a report was filed (twice a year), and a field audit was performed on every facility once a year. Thus, expense and income information were closely monitored. The Colorado reimbursement system, however, does not make use of balance sheet data, and so facility balance sheets were not audited (although they were reported).
>
> Georgia. The auditing in Georgia was generally not intensive though it improved over the period. From 1971-73, two auditors within the Medicaid agency reviewed all cost reports. They checked for arithmetical accuracy and for internal consistency of data. Very little was done to check the reasonableness of the data. On-site verification of the report was minimal. In 1974, the procedures were the same, except that on-site verification was increased. In 1975, a certified public accounting firm was engaged to perform the on-site audits. However, this firm worked on only 15-20 facilities. The other facilities were subjected to the same type of desk review that was used in earlier years.
>
> New York. Prior to 1975, New York had only six auditors who checked nursing home reports as they were received. Given the number of facilities in New York State, this meant that auditing amounted only to desk reviews at best. In 1975 the number of auditors was increased to 300 and an improved auditing program was instituted.

Washington. Facility reports in Washington were subjected to a fairly thorough desk review in all years. As with Colorado, however, this review did not audit the balance sheet information since the Washington State reimbursement program did not require these data. Beginning in 1975, the state instituted selective site visits, which were carried out by an independent firm of auditors.

4. Summary of the Collection of Reports

In summary, the amount of data received from the states raised a question regarding its use in the computation of the rates of return because the representativeness of the sample of usable facility reports by state was unclear. Likewise, the information regarding state auditing practices raised a question concerning the quality of the data. The first question is briefly discussed here and the second question is discussed in a later section.

No attempt has been made to confirm the representativeness of the sample of the usable facility reports. There is no obvious and simple way to determine how representative the available samples are. Little or no financial information is available on the desired population of nursing homes by state. In fact, the precise number of nursing homes in this population is not even available. We believe, however, that the use of our data is appropriate because over 60 percent of all facility reports in each state are usable. The likelihood of bias resulting from such large samples is minimal. In the case of New York, nearly one half of the 50-percent random smaple from all facility reports was received and found to be usable. Once again, there is reason to expect minimal bias with a 50-percent response from a 50-percent random sample of facilities in the state. We recognize that the existence of bias was not explicitly examined: accordingly, the findings from the state studies should be accepted with caution.

B. Coding and Editing of Data

The information contained in the financial reports did not provide directly usable data on the desired variables. In most instances the desired information had to be aggregated or computed from several pieces of data in the cost-financial reports. The exact construction of the set of variables is described in Section D.

1. Coding and Extraction of Data

Coding forms were developed to extract data from the facility reports. Since facility reports varied across states and sometimes within a state across years or across types of facilities, several different coding forms were necessary. All facilities in Colorado filed the same report, and the report was not changed during the time period; hence, a single coding form sufficed for Colorado. Georgia required three coding forms; New York required six (two types of forms, each changed twice); and Washington required three coding forms.

The extent of information that was necessary to obtain the desired set of variables can be seen by examining the coding forms in Section F of this Appendix. These forms list all the variables that were taken from the facility reports and indicate the location on the report form from which the raw data were obtained. The variables on these coding forms have all been given a raw data variable number, shown in column 1 of the coding forms. The construction of the final variables used in the analysis is summarized in Section D in terms of these raw data variable numbers. The coding forms also display the formats of the computer files prepared to store the raw data.

2. Editing of Raw Data

During the process of extracting the raw data from the facility reports, decisions were made to achieve consistency of data across facilities, across states, and across years. It is not possible to discuss each situation where a decision was required. Some of the more important and most frequent decisions, however, are considered below.

Report Period. Facility reports did not always contain financial information for the same period of the calendar year. Generally, a facility made reports according to the calendar dates of its financial year. Reports, however, were assigned to that calendar year which included the closing date for the period of activity reported. In the state of Colorado, data from the two biannual reports in each year were combined to obtain annual figures. If only one biannual report was available on a facility, the annual figures were obtained by multiplying the flow variables, such as total assets or building assets, without adjustment. In the state of

Washington, some facilities made only quarterly or biannual reports instead of annual reports. Once again, annual figures were obtained by converting quarterly of biannual figures to an annual basis by an appropriate multiplication of four times or two times, respectively, for the flow variables.

Blank Entries. A common practice in accounting is to denote "zero" by a blank entry. However, it is not always clear whether a blank entry is an omission of entry or a zero. Each blank entry, however, was examined to confirm if the value could be zero given the other information contained in that facility report and reports for the same facility in other years. If a zero value made sense, the item was entered as a zero. Alternatively, the item was treated as a missing value and accounted for in other ways as described below. There were also some instances among facility reports where the entire page was left blank. A blank page was treated as a missing page if it contained any variable which could not plausibly take a value of zero. Occasionally, there were missing pages from the reports. The information on desired variables from missing pages was treated similarly to missing values.

Missing Values. The treatment of the missing value depended upon the variable involved. If asset or net income variables were involved, the report was automatically discarded. If some other variable was missing, its value was estimated by taking the average value from every other report filed by that facility. If the same information was missing in every report, that facility was dropped from,the sample. These procedures for dealing with missing or incomplete data enabled us to retain the maximum number of facilities in the sample with little impact on the quality of the data.

The raw data extracted from all usable reports were formatted and keypunched by state. Raw data computer files were created to verify the data and to construct the desired set of variables for analysis.

C. Verification of the Data

The task of extracting and coding data on over 35 variables from over 4000 facility reports was likely to contain errors in spite of careful effort in coding and keypunching. The following four checks were conducted to verify the accuracy of the data obtained from the facility reports:

- All keypunching was verified, i.e., cards were punched a second time, and all differences between the first and second punchings were reconciled and corrected as appropriate.

- All variable values greater than three standard deviations from the mean were noted and compared with original facility reports for accuracy.

- All reports for each facility were scanned for large or unusual changes from report to report. All such changes were checked against the original reports to confirm the accuracy of the coded data.

- All raw variables and variables after construction whose value was unexpected (e.g., a negative asset entry) were noted and checked to determine if any error had occurred in recording the data.

If as a result of these verification checks, it was found that the information on key variables was misreported in the facility reports and could not be estimated from other reports of that facility, the data from that facility report were discarded.

In addition to these verification checks, four consistency checks were also employed for each observation. Facility reports were discarded for which consistency among the following set of variables could not be achieved:

- Total assets = total liability + equity.
- Total revenue = total expenditures + profit.
- Accumulated depreciation $\geq$ current depreciation.
- If accumulated depreciation ≥ 0, then current depreciation ≥ 0.

The numbers of usable facility reports shown by year in the last column of Table B-1 are the numbers of reports that satisfied all of the above criteria of editing, verification, and consistency.

D. Variable Construction

The construction of the final variables used in the State Studies involved three steps. These steps take account of the differences in the reported raw variables within and across states, and determine a set of consistently defined final variables of interest. The three steps are as follows:

Step 1: Consistency Within Each State

The first task was to reorganize the coded raw data so that variables were consistently defined within each state. Reporting forms typically changed over the years of the sample period; hence, facilities did not report data in the same categories each year.

The form of the data reorganization is summarized in Tables B-2 through B-5 for each of the four states. Colorado used the same reporting form for all facilities for all years, and so did not require reorganization of raw data variables. The numbers shown in these tables refer to the variable numbers listed on the coding forms attached as Section F of this Appendix.

The output, then, of this step of data reorganization is a set of accounting variables for each state, defined consistently over the years of the sample. These variables serve as inputs to Step 2 of the reorganization.

Step 2: Consistency Across States

The accounting variables for each state (from Step 1) were transformed to create a set of 23 "intermediate" variables that were identically defined across the four states. These intermediate variables were used to construct the final variables of interest for this study. Some of these intermediate variables were used to create the financial ratios used in the Risk and Rate of Return Study and are further discussed in Appendix C.

The transformation of the data from each study into the set of intermediate variables is summarized in Table B-6. The numbers in this table under each state refer to the numbers assigned to each variable in the first column of the respective state Tables B-2 through B-5.

Step 3: Construction of Final Variables

The final step was to take the intermediate variables defined in Step 2, above, and to create from them the variables of interest for this study. Three separate sets of final variables of interest were generated. The first set contained seven variables that were used to classify nursing homes into different groups for purposes of calculating average group rate of return measures. The second set contained four different

TABLE B-2

COLORADO: STEP 1 DATA REORGANIZATION

Variable Name	1971-75 Raw Data Variable Number
1. Type of Ownership	1
2. Total bed-days, intermediate	2
3. Total bed-days, skilled	3
4. Total patient days, intermediate	4
5. Total patient days, skilled	5
6. Gross Revenue	6
7. Net Revenue	7
8. Rent	8
9. Interest	9
10. Total Expenses	10
11. Current Depreciation	11
12. Current Amortization	12
13. Land	13
14. Cash	14
15. Receivables	15
16. Accumulated Depreciation	16
17. Total Assets	17
18. Current Liabilities	18
19. Capital Stock + Paid in Surplus	19
20. Retained Earnings, Current Year	20
21. Retained Earnings, Prior Year	21
22. Partners'/Proprietors' Capital Account, Current Year	22
23. Partners'/Proprietors' Capital Account, Prior Year	23
24. Partners'/Proprietors' Drawing Account, Current Year	24
25. Partners'/Proprietors' Drawing Account, Prior Year	25
26. Nonprofit Equity, Current Year	26
27. Nonprofit Equity, Prior Year	27
28. Period of Report	28

TABLE B-3

GEORGIA: STEP 1 DATA REORGANIZATION

Variable Name	1973 Raw Data Variable Number	1974-1975 Raw Data Variable Number
1. Type of Ownership	1	1
2. Skilled Bed Days Available	2	2
3. Non-Skilled Bed Days Available	3	3
4. Medicaid Skilled Bed Days Occupied	Not Reported[1/]	4
5. Medicaid Unskilled Bed Days Unoccupied	Not Reported[1/]	5
6. Skilled Bed Days Total Occupied	4	6
7. Unskilled Bed Days Total Occupied	5	7
8. Skilled Care Patient Revenue	6	8
9. Unskilled Care Patient Revenue	7	9
10. Net Patient Revenue	8	10
11. Total Other Income	9	11
12. Net Income	10	12
13. Cash	11	13
14. Inventory	12	14
15. Current Assets	13	15
16. Land	14	16
17. Accumulated Depreciation	15	17
18. Total Fixed Assets	16	18
19. Total Assets	17	19
20. Current Liabilities	18	20
21. Total Liabilities	19	21
22. Common Stock if Corporation	20	22
23. Contributed Equity	21	23
24. Retained Earnings	22	24
25. Current Period Earnings	23	25
26. Total Capital (Equity)	24	26
27. Rent	25	27
28. Depreciation Expense	26	28
29. Interest	27	29
30. Private Payment Rate	28	30
31. Medicare Payment Rate	29	31
32. Medicaid Payment Rate	30	32
33. Number of Months Covered by Report	31	33
34. Total Private Revenue	Not Reported	34
35. Total Medicaid Revenue	Not Reported	35
36. Total Medicare Revenue	Not Reported	36
37. Total Outpatient Medicare Revenue	Not Reported	37

[1/] Estimated from subsequent reports based on the ratio of public to private patients.

TABLE B-4

NEW YORK: STEP 1 DATA REORGANIZATION

Variable Name	1971-1973 Raw Data Variable Number	1974 Raw Data Variable Number	1975 Raw Data Variable Number
1. Type of Ownership	1	1	1
2. Type of Facility	2	2	2
3. Total Certified Bed Capacity	3	3	3
4. Nursing Home Service Certified Bed Capacity	4	4	4
5. Other Certified Bed Capacity	5	5	5
6. Medicaid Care Provided	6	6	6
7. Medicare Care Provided	7	7	7
8. Total Care Provided	8	8	8
9. Cash Balance	9	9	9
10. Accounts Receivable	10	10	10
11. Inventories	11	11	11
12. Total Current Assets	12	12	12
13. Land	13	13	13
14. Accumulated Depreciation	14	14	14
15. Total Fixed Assets	15	15	15
16. Total Assets	16	16	16
17. Accounts Payable	17	17	17
18. Accrued Payroll	18	18	18
19. Accrued Taxes Payable	19	19	19
20. Total Current Liabilities	20	20	20
21. Total Liabilities	21	21	21
22. Total Equity at end of Prior Year	23	22	22
23. Excess over expenditures or Revenue	24	23	23
24. Additional Capital Contributed or Withdrawn	25-26	24	24
25. Total Revenue	27	25	25
26. Net Income or deficit (Profit)	28	26	26
27. Medicaid Income	29	27	27
28. Medicare Income	30	28	28
29. Private Patient Income	31	29	29
30. Total Income from Medicaid, Medicare, and Private Patients	32	30	30
31. Depreciation expense	33	31	31
32. Interest	34	33	33
33. Rent	35	34	34
34. Amortization	36	32	32+35
35. Equity	22	16-21	16-21
36. Number of Months of Report	37	35	36

TABLE B-5

WASHINGTON: STEP 1 DATA REORGANIZATION

Variable Name	1971 Raw Data Variable Number	1973 Raw Data Variable Number	1974-1975 Raw Data Variable Number
1. Type of Ownership	1	1	1
2. Cash	1/ Not Reported	2	2
3. Inventories	Not Reported	3	3
4. Total Current Assets	7	4	4
5. Accumulated Depreciation and Amortization	9	5	5
6. Total Assets	11	6	6
7. Total Current Liabilities	12	7	7
8. Total Equity	14	8	8
9. Private Patient Revenue	20	24	9
10. Medicare Patient Revenue	19	Not Reported	10
11. Medicaid Patient Revenue	18	25	11
12. Total Revenue	15	9	12
13. Net Income or deficit (Profit)	17	11	13
14. Capital Withdrawals, end of year	Not Reported	12	14
15. Capital Contributions, end of year	Not Reported	13	15
16. Retained Earnings, end of year	Not Reported	15	16
17. Total Capacity Bed Days	6	19	17
18. Private Patient Days	4	20	18
19. Medicare Patient Days	3	21	19
20. Medicaid Patient Days, (ICF)	5	23	20
21. Medicaid Patient Days, (SNF)	2-5	22	21
22. Total Patient Days	2+3+4	20+21+22+23	22
23. Depreciation	21	16	23
24. Amortization	1/ Not Reported	17	24
25. Interest	23	10	25
26. Rent or Lease	22	18	26
27. Balance due Provider	Not Reported	Not Reported	27
28. Number of months included in report	16	26	28
29. Total Liabilities	11-14	6-8	6-8
30. Land	8	Not Recorded	Not Recorded

1/ Entered as average value for other years.

TABLE B-6

CONSTRUCTION OF INTERMEDIATE STATE DATA VARIABLES[a]

	Construction			
Variable Name	Colorado	Georgia	New York	Washington
1. Total Number of Beds	$\frac{2+3}{365}$	$\frac{2+3}{365}$	3	$\frac{17}{365}$
2. Total Number of Bed Days Provided	4+5	6+7	8	22
3. Public Patient Care	Not Reported	4+5	6+7	19+20+21
4. Private Patient Care	Not Reported	6+7-4-5	8-6-7	18
5. Total Liabilities	17-22+24[b] 17-19-20[c] 17-26[d]	21	21	29
6. Equity	22-24[b] 19+20[c] 26[d]	26	35	8
7. Rent	8	27	33	26
8. Total Expenditures	10	10+11-12	25-26	12-13
9. Total Assets	17	19	16	6
10. Cash	14	13	9	2
11. Inventories	Not Reported	14	11	3
12. Current Assets	14+15	15	12	4
13. Current Liabilities	18	20	20	7
14. Profit	6-10	12	23	13
15. Accumulated Depreciation	16	17	14	5
16. Current Depreciation	11	28	31	23
17. Amortization	12	Not Reported	34	24
18. Type of Ownership	1	1	1	1
19. Interest	9	29	32	25
20. Gross Revenue	6	10+12	25	12
21. Fixed Assets	17-14-15	18	13	6-4
22. Land	13	16	13	31
23. Number of Months of Report	28	33	36	28

[a] The numbers in the columns for each state refer to the number of the variables in the first column of Tables B-2 through B-5.

[b] Proprietorships and Partnerships.

[c] Corporations.

[d] Nonprofit Organizations.

rate of return measures examined in this study. The third set of final variables was generated to compute rate of return measures adjusted for inflation. The construction of the first two sets of variables is defined in Table B-7 below. The numbers in this table refer to the numbers assigned to the intermediate variables in the left-hand column of Table B-6 above. The procedure for adjusting for inflation is described below.

Once the final variables were constructed, two further tasks were performed: (1) the variables were adjusted for inflation, and (2) the composition of fixed assets was estimated.

Adjusting Values for Inflation. Adjusting values for inflation was complicated by the fact that neither the composition of facility assets nor the age of assets were available to us. This required developing a method to adjust asset values for inflation indirectly. Specifically, we estimated inflation-adjusted values in three steps. First, we estimated the breakdown of total fixed assets in three categories--land, buildings, and equipment. Next we determined an average age for each type of fixed asset. Finally, we used the available price indexes to transform historical dollar values into constant dollar values. Details of this process are described below.

Estimating the Composition of Fixed Assets. In order to break gross value of fixed assets (book value of fixed assets plus accumulated depreciation) into its three components (land, buildings, equipment), we separated book value into value of gross depreciable assets (buildings and equipment) and value of land. For facilities that reported land values separately this was no problem. For facilities that reported land value as zero, the problem was to determine whether the facility truly rented its land, or whether land was consolidated with buildings and reported as one figure. If the facility reported a zero value of land and the ratio of rental expense to beds was greater than two standard deviations above the mean for those facilities that did report positive land value, then we assumed that the facility leased land and buildings. In those circumstances, the total book value of depreciable assets was considered to be equipment only. Thus, we were able to identify the assets that were included in reported value of fixed assets for all facilities.

TABLE B-7

CONSTRUCTION OF FINAL STATE DATA VARIABLES

Variables Used to Classify Nursing Homes	Definition in Terms of Intermediate Variables[a]
1. Type of Ownership	18
2. Bed Capacity	1
3. Occupancy Rates	$\frac{(2/1)}{365}$
4. Private to Total Patient Ratio	4/2
5. Ownership of Fixed Assets	If 22 = 0, assets rented If 22 > 0, assets owned
6. Equity-Debt	6/5
7. Debt-Total Assets Ratio	5/9
Rate of Return Measures	
8. Overall Rate of Return	$\frac{14 + 19}{9}$
9. Rate of Return on Equity	$\frac{14}{6}$
10. Adjusted Overall Rate of Return	$\frac{14 + 19 + 16 + 17}{9 + 15}$
11. Adjusted Rate of Return on Equity	$\frac{14 + 16 + 17}{6 + 15}$

---

[a] The number in this column refers to the number in the first column of Table B-6.

The problem of splitting the gross fixed-asset value of a facility among the three types of assets (except in facilities where the land and buildings were rented) still remained. In order to split the fixed-asset values into three components--land, buildings, and equipment--an estimate of the average proportion of costs that could be attributed to each type of asset was calculated. The average proportions were estimated from a random sample of 25 facilities in each state. Specifically these proportions were calculated as follows:

$$\mathrm{LNDPRP}_j = \sum_{i=1}^{25} \left(\frac{\mathrm{LNDV}}{\mathrm{GFAV}}\right)_{ij}$$

$$\mathrm{BDGPRP}_j = \sum_{i=1}^{25} \left(\frac{\mathrm{BDGV}}{\mathrm{GFAV}}\right)_{ij}$$

$$\mathrm{EQPPRP}_j = \sum_{i=1}^{25} \left(\frac{\mathrm{EQPV}}{\mathrm{GFAV}}\right)_{ij}$$

where

i varies over facilities in state j

j varies over the four states

LNDPRP_j = Average proportion of fixed asset value attributed to land in state j.

BDGPRP_j = Average proportion of fixed asset value attributed to buildings in state j.

EQPPRP_j = Average proportion of fixed asset value attributed to equipment in state j.

LNDV_{ij} = Reported land value of facility i in state j.

BDGV_{ij} = Reported building value of facility i in state j.

EQPV_{ij} = Reported equipment value of facility i in state j.

GFAV_{ij} = Reported gross fixed asset value of facility i in state j; (nondepreciated).

The reported GFAV for each facility was split into land, buildings, and equipment values by the use of average proportion values of each asset as follows:

$\mathrm{LNDV}_{ij} = \mathrm{LNDPRP}_{ij} * \mathrm{GFAV}_{ij}$

$\mathrm{BDGV}_{ij} = \mathrm{BDGPRP}_{ij} * \mathrm{GFAV}_{ij}$

$\mathrm{EQPV}_{ij} = \mathrm{EQPPRP}_{ij} * \mathrm{GFAV}_{ij}$

For those facilities that reported land values separately, the reported depreciable asset value (DEPAV), i.e., value of buildings and equipment, was split as follows:

$$BDGV_{ij} = BDGPRP_{ij} / \left(BDGPRP_{ij} + EQPPRP_{ij} \right) * DEPAV_{ij}$$

$$EQPV_{ij} = EQPPRP_{ij} / \left(BDGPRP_{ij} + EQPPRP_{ij} \right) * DEPAV_{ij}$$

As a result of this step, we obtained a separate gross book value for land, buildings, and equipment for each facility in the four states.

Determination of Average Asset Age by Asset Type. Having determined the book values by asset type, we had to estimate the age of each asset owned by a facility. Age of an asset was defined as the number of years the asset was owned by the facility. Land and buildings were assumed to be purchased at the same date.

Average age of assets was estimated as the ratio of accumulated depreciation to current depreciation expense for that asset type. However, neither current nor accumulated depreciation was separately reported for buildings or equipment. We therefore had to assume an average depreciable lifetime of 25 years for buildings, and of 10 years for equipment. Further, by assuming straight-line depreciation, we calculated the current depreciation values for both buildings and equipment using the 25- and 10-year rates respectively. The accumulated depreciation was divided between buildings and equipment in the same ratio as current depreciation expense reported in the financial reports. The average age for buildings and equipment was then determined by the ratios of accumulated depreciation to current depreciation for buildings and equipment.

Transform Historic Dollar Values into Current Dollars. Having computed an average age for each type of asset for each facility, we multiplied historic book values by an inflation factor to convert them into current dollars. The inflation factor was calculated as the ratio of the "current" (i.e., the year of the report) value of an appropriate price index divided by its value lagged by the number of years equal to the age of the asset in question.

The Construction Cost Index (CCI) was used for buildings and the Wholesale Price Index #12 (WPI#12), an index for household durables, was used for equipment. For land, the implicit GNP deflator (GNP) was used.

Current values were computed using the following formulas:

$$CBDGV_t = BDG_t * \frac{CCI_t}{CCI_{t-Age_B}}$$

$$CEQPV_t = EQPV_t * \frac{WPI\#12_t}{WPI\#12_{t-Age_E}}$$

$$CLNDV_t = LNDV_t * \frac{GNP_t}{GNP_{t-Age_B}}$$

where

$CBDGV_t$ = current buildings value in period t;

$CEQPV_t$ = current equipment value in period t;

$CLNDV_t$ = current land value in period t;

Age_B = age of buildings;

Age_E = age of equipment;

and other terms as previously defined.

E. Means and Standard Deviations of Data

The means and standard deviations of intermediate variables used in the State Studies are presented in Tables B-8 and B-9. The difference between the summary statistics of intermediate variables in the two tables is due to the difference in the number of facilities included to estimate overall rates of return and rates of return on equity. Separate summary statistics are shown for nursing homes grouped by type of ownership in each of the four states.

The mean and standard deviation of variables used to group facilities by specific characteristics are set out in Table B-10.

TABLE B-8

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES BY STATE AND TYPE OF OWNERSHIP

(Overall Rate of Return Sample - Numbers in Thousands)

		Number of Facilities	Total Assets	Total Liabilities	Equity	Accumulative Depreciation	TA + AD	Equity +AD	Current Assets	Cash	Inventories	Fixed Assets	Current Liabilities
COLORADO	Proprietorships/ Partnerships	43	253 (355)	240 (357)	12 (22)	46 (57)	299 (393)	59 (62)	24 (29)	7 (11)	NA	229 (339)	17 (19)
	Corporations	119	403 (338)	343 (330)	59 (120)	78 (82)	481 (380)	137 (144)	45 (31)	12 (16)	NA	358 (330)	29 (33)
	Nonprofit Facilities	38	1630 (2520	960 (1170)	672 (2290)	199 (285)	1830 (2600)	871 (2310)	170 (578)	21 (25)	NA	1460 (2020)	41 (58)
	All Facilities	200	604 (1230)	438 (642)	165 (1020)	94 (150)	699 (1300)	260 (1040)	64 (256)	12 (17)	NA	540 (1020)	29 (37)
GEORGIA	Proprietorships/ Partnerships	27	319 (255)	253 (249)	61 (109)	94 (82)	413 (311)	154 (139)	44 (30)	9 (10)	1 (2)	269 (235)	44 (30)
	Corporations	190	427 (381)	348 (360)	73 (151)	92 (91)	520 (432)	165 (201)	71 (58)	14 (22)	2 (3)	335 (355)	69 (75)
	Nonprofit Facilities	48	954 (107)	327 (479)	608 (925)	187 (194)	114 (1210)	796 (1060)	159 (323)	53 (125)	7 (14)	755 (829)	93 (92)
	All Facilities	265	512 (600)	334 (375)	168 (461)	109 (120)	621 (682)	278 (541)	84 (149)	20 (58)	3 (7)	404 (495)	71 (76)
NEW YORK	Proprietorships/ Partnerships	124	756 (1420)	728 (1420)	25 (243)	142 (270)	898 (1660)	167 (363)	174 (208)	44 (62)	4 (5)	530 (1240)	254 (302)
	Corporations	24	701 (916)	618 (889)	95 (120)	122 (156)	823 (1020)	216 (240)	192 (146)	42 (37)	6 (8)	438 (815)	181 (121)
	Nonprofit Facilities	46	4200 (401)	2130 (3760)	1860 (1830)	609 (632)	4810 (4270)	2470 (2180)	643 (738)	211 (349)	9 (14)	2990 (3160)	379 (807)
	All Facilities	194	1580 (2720	1090 (2280)	476 (1200)	252 (430)	1830 (3000)	728 (1480)	290 (446)	84 (191)	5 (9)	1110 (2130)	275 (467)
WASHINGTON	Proprietorships/ Partnerships	88	200 (152)	167 (159)	33 (71)	50 (38)	249 (175)	82 (84)	34 (29)	6 (9)	1 (2)	166 (146)	38 (37)
	Corporations	176	360 (435)	274 (396)	86 (130)	88 (94)	447 (510)	173 (195)	74 (91)	12 (17)	4 (9)	286 (372)	70 (86)
	Nonprofit Facilities	26	705 (594)	401 (516)	304 (312)	183 (138)	889 (705)	448 (393)	82 (103)	30 (50)	2 (3)	624 (586)	44 (62)
	All Facilities	290	342 (413)	253 (361)	89 (163)	85 (93)	427 (488)	174 (223)	62 (81)	12 (22)	3 (7)	280 (367)	58 (73)

TABLE B-8 (cont.)

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES BY STATE AND TYPE OF OWNERSHIP
(Overall Rate of Return Sample - Numbers in Thousands)

		Number of Facilities	Total Patient Days	Public Patient Days	Private Patient Days	Gross Revenue	Total Expenditures	Profit	Interest	Current Depreciation	Amortization*	Rent	P+CD+CA+I	P+CD+CA
COLORADO	Proprietorships/ Partnerships	43	18 (11)	NA	NA	242 (174)	235 (174)	7 (24)	14 (18)	11 (11)	20 (105)	6 (17)	32 (33)	18 (23)
	Corporations	119	33 (15)	NA	NA	467 (230)	462 (223)	5 (45)	22 (21)	16 (11)	382 (1642)	27 (43)	43 (52)	21 (44)
	Nonprofit Facilities	38	30 (41)	NA	NA	306 (329)	614 (1070)	-228 (1080)	39 (59)	37 (47)	1490 (9055)	4 (12)	-151 (108)	-189 (1080)
	All Facilities	200	29 .(23)	NA	NA	403 (256)	442 (514)	-39 (476)	23 (32)	19 (24)	515 (4134)	18 (36)	-4 (476)	-20 (476)
GEORGIA	Proprietorships/. Partnerships	27	26 (14)	16 (15)	10 (13)	399 (236)	393 (238)	6 (29)	19 (24)	17 (11)	NA	17 (45)	42 (45)	23 (35)
	Corporations	190	30 (12)	20 (14)	9 (12)	446 (208)	440 (203)	6 (31)	23 (28)	20 (15)	NA	23 (38)	50 (47)	26 (33)
	Nonprofit Facilities	48	28 (26)	20 (22)	8 (24)	425 (399)	440 (396)	-15 (40)	12 (15)	30 (29)	NA	1 (5)	27 (58)	15 (54)
	All Facilities	265	29 (16)	19 (16)	9 (15)	438 (255)	435 (252)	3 (33)	21 (26)	21 (19)	NA	19 (37)	45 (49)	24 (38)
NEW YORK	Proprietorships/ Partnerships	124	45 (31)	35 (30)	10 (8)	1510 (1320)	1050 (1090)	30 (89)	35 (88)	27 (48)	1619 (4481)	136 (147)	94 (175)	59 (117)
	Corporations	24	40 (16)	28 (16)	12 (6)	1210 (725)	702 (595)	15 (87)	32 (63)	21 (30)	994 (1720)	108 (92)	69 (104)	38 (87)
	Nonprofit Facilities	46	63 (47)	40 (38)	22 (21)	2180 (2160)	1340 (1680)	20 (136)	37 (68)	120 (149)	1317 (7502)	3 (14)	178 (239)	142 (198)
	All Facilities	194	49 (35)	36 (31)	13 (13)	1630 (1540)	1080 (1220)	26 (101)	35 (81)	49 (92)	1469 (5146)	100 (133)	111 (189)	76 (142)
WASHINGTON	Proprietorships/ Partnerships	88	25 (13)	17 (11)	8 (5)	343 (232)	333 (227)	9 (26)	12 (13)	12 (12)	783 (3138)	26 (39)	34 (33)	22 (27)
	Corporations	176	31 (16)	21 (13)	10 (8)	448 (269)	439 (261)	9 (26)	12 (17)	15 (13)	655 (1937)	32 (43)	37 (39)	25 (30)
	Nonprofit Facilities	26	33 (22)	17 (13)	15 (13)	460 (275)	457 (285)	3 (65)	19 (28)	27 (28)	181 (434)	12 (51)	49 (73)	30 (74)
	All Facilities	290	30 (16)	20 (13)	10 (8)	417 (263)	408 (258)	8 (32)	13 (17)	15 (15)	651 (2299)	28 (43)	37 (42)	24 (35)

*Not in thousands.

TABLE B-9

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES BY STATE AND TYPE OF OWNERSHIP

(Rate of Return on Equity Sample - Numbers In Thousands)

		Number of Facilities	Total Assets	Total Liabilities	Equity	Accumulated Depreciation	TA+AD	EQ+AD	Current Assets	Cash	Inventories	Fixed Assets	Current Liabilities
COLORADO	Proprietorships/ Partnerships	29	172 (191)	150 (186)	22 (18)	32 (30)	204 (207)	54 (44)	16 (12)	4 (6)	NA	156 (182)	11 (9)
	Corporations	91	391 (325)	296 (274)	95 (101)	80 (76)	471 (364)	175 (142)	45 (31)	13 (17)	NA	346 (317)	24 (14)
	Nonprofit Facilities	29	168 (2850)	769 (1170)	914 (258)	210 (272)	1890 (2920)	1120 (2600)	213 (659)	24 (27)	NA	1460 (2280)	40 (63)
	All Facilities	149	600 (1380)	360 (599)	240 (1170)	96 (145)	696 (1430)	336 (1200)	72 (296)	13 (19)	NA	528 (1120)	25 (31)
GEORGIA	Proprietorships/ Partnerships	23	322 (255)	240 (236)	78 (108)	97 (75)	419 (301)	175 (137)	41 (30)	9 (11)	1 (2)	276 (232)	40 (29)
	Corporations	145	399 (376)	286 (318)	108 (154)	98 (95)	497 (432)	206 (210)	73 (63)	16 (25)	2 (4)	308 (352)	60 (65)
	Nonprofit Facilities	41	1050 (1120)	308 (506)	724 (954)	212 (199)	1260 (1260)	937 (1090)	173 (347)	59 (134)	7 (15)	837 (869)	89 (84)
	All Facilities	209	519 (649)	285 (354)	225 (504)	120 (128)	639 (737)	346 (590)	90 (166)	24 (65)	3 (8)	408 (531)	64 (68)
NEW YORK	Proprietorships/ Partnerships	81	800 (1490)	661 (1410)	137 (176)	149 (238)	950 (1700)	286 (370)	169 (231)	48 (69)	3 (6)	577 (1260)	166 (243)
	Corporations	20	819 (963)	715 (947)	121 (112)	130 (166)	949 (1080)	252 (248)	217 (148)	49 (36)	6 (8)	518 (874)	190 (130)
	Nonprofit Facilities	44	4190 (4060)	2200 (3760)	1960 (1810)	618 (645)	4810 (4320)	2570 (2170)	643 (747)	219 (355)	8 (13)	2970 (3200)	279 (380)
	All Facilities	146	1840 (2970)	1140 (2450)	697 (1310)	291 (457)	2140 (3250)	988 (1620)	321 (498)	100 (217)	5 (9)	1300 (2310)	204 (285)
WASHINGTON	Proprietorships/ Partnerships	71	182 (134)	128 (124)	55 (53)	45 (35)	228 (154)	100 (73)	32 (28)	7 (10)	1 (2)	151 (124)	29 (27)
	Corporations	151	379 (456)	273 (411)	106 (136)	94 (97)	473 (534)	200 (195)	76 (93)	13 (18)	4 (10)	304 (390)	68 (90)
	Nonprofit Facilities	24	748 (597)	399 (524)	349 (270)	197 (135)	946 (703)	547 (341)	82 (106)	32 (52)	2 (3)	666 (589)	38 (40)
	All Facilities	246	358 (436)	243 (375)	115 (159)	90 (97)	449 (516)	205 (224)	63 (84)	13 (23)	3 (8)	295 (387)	54 (75)

TABLE B-9 (cont.)

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES BY STATE AND TYPE OF OWNERSHIP
(Rate of Return on Equity Sample - Numbers in Thousands)

		Number of Facilities	Total Patient Days	Public Patient Days	Private Patient Days	Gross Revenue	Total Expenditures	Profit	Interest	Current Depreciation	Amortization*	Rent	π+CD+CAR+INT	π+CD+CAR
COLORADO	Proprietorships/ Partnerships	29	15 (10)	NA	NA	193 (159)	187 (163)	6 (25)	12 (18)	9 (8)	30 (128)	1 (3)	27 (32)	15 (24)
	Corporations	91	33 (14)	NA	NA	467 (204)	456 (195)	10 (38)	20 (18)	15 (11)	398 (1839)	26 (41)	47 (46)	26 (39)
	Nonprofit Facilities	29	33 (46)	NA	NA	380 (359)	668 (1220)	-288 (1230)	33 (64)	37 (51)	1952 (10364)	3 (11)	-216 (1240)	-249 (1240)
	All Facilities	149	29 (24)	NA	NA	397 (256)	445 (577)	-49 (551)	21 (33)	18 (26)	629 (4978)	17 (35)	-8 (551)	-30 (551)
GEORGIA	Proprietorships/ Partnerships	23	24 (13)	13 (13)	11 (14)	364 (214)	354 (209)	10 (27)	18 (24)	17 (9)	NA	6 (21)	45 (38)	27 (30)
	Corporations	145	30 (12)	20 (14)	9 (10)	447 (209)	433 (200)	13 (25)	19 (25)	18 (14)	NA	22 (34)	51 (47)	32 (30)
	Nonprofit Facilities	41	30 (28)	22 (23)	8 (26)	453 (425)	466 (423)	-14 (41)	11 (15)	33 (31)	NA	0 (0)	31 (60)	19 (56)
	All Facilities	209	29 (16)	20 (16)	9 (15)	439 (266)	431 (260)	8 (31)	18 (23)	21 (19)	NA	16 (31)	46 (49)	29 (37)
NEW YORK	Proprietorships/ Partnerships	81	38 (30)	27 (26)	11 (8)	1250 (1300)	768 (981)	49 (82)	37 (84)	31 (54)	1523 (4383)	90 (126)	118 (186)	82 (123)
	Corporations	20	43 (16)	31 (16)	12 (6)	1280 (776)	763 (633)	22 (94)	38 (67)	24 (33)	1193 (1825)	111 (99)	85 (107)	48 (92)
	Nonprofit Facilities	44	63 (48)	39 (39)	22 (21)	2150 (2190)	320 (1700)	21 (138)	33 (67)	122 (152)	1335 (7668)	3 (14)	177 (244)	144 (200)
	All Facilities	146	46 (37)	32 (30)	14 (14)	1530 (1620)	938 (1230)	37 (104)	36 (76)	58 (103)	1420 (5375)	66 (109)	132 (199)	97 (151)
WASHINGTON	Proprietorships/ Partnerships	71	24 (14)	16 (11)	7 (5)	314 (224)	300 (215)	14 (25)	9 (9)	10 (9)	583 (2108)	23 (35)	33 (32)	24 (27)
	Corporations	151	32 (16)	21 (13)	11 (8)	455 (269)	443 (260)	11 (26)	12 (18)	16 (13)	699 (2051)	30 (42)	40 (41)	28 (30)
	Nonprofit Facilities	24	34 (22)	18 (13)	16 (13)	462 (270)	449 (262)	14 (33)	16 (25)	29 (29)	184 (503)	1 (5)	59 (60)	43 (46)
	All Facilities	246	30 (17)	20 (13)	10 (8)	415 (264)	402 (256)	12 (27)	12 (17)	15 (15)	615 (1973)	25 (39)	40 (41)	28 (32)

*Not in thousands.

TABLE B-10

MEANS AND STANDARD DEVIATIONS FOR VALUES OF FIVE FACILITY CHARACTERISTICS, BY TYPE OF FACILITY AND BY STATE 1971-75 (Standard Deviations in Parentheses)

State and Type of Facility	Number of Beds	Occupancy Rate	Debt / Total Assets	Equity / Debt	PPD[a] / TPD
Colorado					
Proprietorships n= 43	54.30 (32.08)	.907 (.108)	.793 (.308)	.596 (1.681)	—[b]
Corporations n=119	102.20 (46.56)	.895 (.123)	.844 (.272)	.431 (1.190)	—
All Proprietaries n=162	89.50 (3.77)	.898 (.009)	.831 (.022)	.474 (.105)	—
Nonprofit Facilities n= 38	90.20 (118.18)	.909 (.076)	.697 (.179)	6.150 (27.147)	—
All Facilities n=200	89.60 (66.81)	.900 (.112)	.805 (.317)	1.563 (12.036)	—
Georgia					
Proprietorships n= 27	77.60 (41.23)	.950 (.115)	.702 (.306)	.888 (1.577)	.372 (.403)
Corporations n=190	89.70 (34.42)	.922 (.108)	.764 (.328)	1.183 (3.663)	.310 (.364)
All Proprietaries n=217	88.10 (2.41)	.925 (.007)	.756 (.022)	1.146 (.236)	.318 (.025)
Nonprofit Facilities n= 48	83.20 (74.41)	.944 (.108)	.468 (.439)	7.341 (11.400)	.229 (.420)
All Facilities n=265	87.20 (44.95)	.929 (.109)	.704 (.365)	2.268 (6.222)	.302 (.379)
New York					
Proprietorships n=124	130.59 (91.29)	.948 (.088)	.961 (.594)	.604 (1.777)	.280 (.217)
Corporations n= 24	123.04 (49.52)	.912 (.168)	.844 (.438)	.498 (1.098)	.346 (.204)
All Proprietaries n=148	129.40 (7.05)	.942 (.009)	.942 (.047)	.587 (.138)	.291 (.018)
Nonprofit Facilities n= 47	183.39 (136.67)	.940 (.071)	.405 (.357)	35.971 (204.303)	.375 (.254)
All Facilities n=195	142.50 (102.74)	.942 (.097)	.812 (.575)	8.977 (99.809)	.311 (.227)
Washington					
Proprietorships n= 88	74.86 (41.24)	.929 (.192)	.803 (.544)	1.985 (6.960)	.320 (.160)
Corporations n=176	93.12 (48.91)	.939 (.141)	.725 (.292)	1.075 (3.477)	.331 (.190)
All Proprietaries n=264	87.00 (2.90)	.936 (.010)	.751 (.024)	1.376 (.303)	.327 (.011)
Nonprofit Facilities n= 26	95.61 (59.94)	.915 (.092)	.539 (.473)	10.608 (37.315)	.471 (.186)
All Facilities n=290	87.31 (48.42)	.934 (.155)	.732 (.406)	2.177 (12.053)	.340 (.185)

[a] The ratio of private patient days to total patient days.

[b] Data unavailable.

F. Coding Forms for States

The coding forms for each of the states are as follows:

1. Coding Form 1: Colorado Data, 1971-75.[1]
2. Coding Form 2: Georgia Data, 1971-72.
3. Coding Form 3: Georgia Data, 1973.
4. Coding Form 4: Georgia Data, 1974 and 1975.
5. Coding Form 5: New York Data, for Profit Facilities, 1971-73.
6. Coding Form 6: New York Data, for Profit Facilities, 1974.
7. Coding Form 7: New York Data, for Profit Facilities, 1975.
8. Coding Form 8: New York Data, Nonprofit Facilties, 1971-73.
9. Coding Form 9: New York Data, Nonprofit Facilities, 1974.
10. Coding Form 10: New York Data, Nonprofit Facilities, 1975.
11. Coding Form 11: Washington Data, 1971.
12. Coding Form 12: Washington Data, 1973.
13. Coding Form 13: Washington Data, 1974 and 1975.

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[1] The identification of the data by state is explained at the beginning of Coding Forms 1, 2, 5, and 11 only.

1. Coding Form 1: Colorado Data, 1971-1975

Identification of Colorado Data

The first five characters on each card are used to identify the facility, reporting period, and card number in each case.

Columns 1-3: the facility number

Column 4: the year of the report (1, 2, 3, 4, 5)

Column 5: the card number (1-8) (4 cards/report)

Column 80 is a state specific variable; Colorado = 1.

Raw Data Variable Number	Variable Name	Location of Data on the Report	Card	Column
1	Type of Ownership: Proprietorship = 0 Partnership = 1 Corporation = 2 Nonprofit Church = 3 Government = 4 Nonprofit, other = 5 Missing = 9	Cover page: "Financial & Statistical Report for Nursing Homes" item (A)	1,5	6
2	Total bed-days for reporting period, Intermediate	Cover page: item (C), line 3; column 1	1,5	7-15
3	Total bed-days for reporting period, Skilled	Cover page: item (C), line 3; column 2	1,5	16-25
4	Total patient days for reporting period, Intermediate	Cover page: item (C), line 4; column 1	1,5	26-35
5	Total patient days for reporting period, Skilled	Cover page: item (C), line 4; column 2	1,5	36-45
6	Gross Revenue	Schedule A	1,5	46-55
7	Net Revenue	Schedule A	1,5	56-65
8	Rental of Facility, paid, and Rental of Equipment, paid	Schedule B	1,5	66-75
9	Interest Expenses	Schedule C, line 29, column 8	2,6	7-15
10	Total Expenses	Schedule C, line 34, column 8	2,6	16-25
11	Total Recorded Depreciation Expense (sum of equipment and building)	Schedule D	2,6	26-35

Colorado, 1971-1975

Variable #	Variable Name	Schedule	Card	Column
12	Total Recorded Amortization Expense	Schedule D	2,6	36-45
13	Land	Schedule D	2,6	46-55
14	Cash, current year	Schedule E	2,6	56-65
15	Receivable from patients, current, and Receivable from others, current	Schedule E	2,6	66-75
16	Reserves for Depreciation, buildings and improvements, current year, and Reserves for Depreciation, equipment, current year	Schedule E	3,7	7-15
17	Total Assets, current year	Schedule E	3,7	16-25
18	Accounts Payable, current year, plus Accrued Taxes, current year, plus Current Financing, Medicare, current year	Schedule E	3,7	26-35
19	Capital Stock, current year, plus Paid in Surplus, current year	Schedule E	3,7	36-45
20	Retained Earnings, current year	Schedule E	3,7	46-55
21	Retained Earnings, prior year	Schedule E	3,7	56-65
22	Partners'/Proprietors' Capital Account, current year	Schedule E	3,7	66-75
23	Partners'/Proprietors' Capital Account, prior year	Schedule E	4,8	7-15
24	Partners'/Proprietors' Drawing Account, current year	Schedule E	4,8	16-25
25	Partners'/Proprietors' Drawing Account, prior year	Schedule E	4,8	26-35
26	Equity (Nonprofit), current year	Schedule E	4,8	36-45

Colorado, 1971-1975

Variable #	Variable Name	Schedule	Card	Column
27	Equity (Nonprofit), prior year	Schedule E	4,8	46-55
28	Period of Report: Month/Year through Month/Year (e.g., 9/1 through 2/2, —091—022)	All Schedules	4,8	56-60

NOTE: Source of Gross Revenue:

Private Medicaid Medicare	not found

2. Coding Form 2: Georgia Data, 1971-1972

Identification of Georgia Data

The first five characters on each card are used to identify the facility, reporting period, and card number in each case.

Columns 1-3: the facility number

Column 4: the year of the report (1, 2, 3, 4, 5)

Column 5: the card number (1-7)

Column 80 is a state specific variable; Georgia = 3.

1971-1972

Raw Data Variable Number	Variable Name	Location of Data on the Report	Card	Column
1	B. Statistical Data - Patients			
	3. Total available bed-days for fiscal period	1	1	7-15
2	4. Total patient days	1	1	16-25
3	a. Total patient days-ECF	1	1	26-35
4	b. Total patient days-Medicaid	1	1	36-45
	C. Operating Expenses			
5	1. Total amount of expenses per books	1	1	46-55
	A. Net Worth - end of last fiscal year			
6	3. Retained Earnings	6	1	56-65
7	4. Total Net Worth	6	1	66-75
	B. Net Worth - end of this fiscal year			
8	3. Retained Earnings	6	2	6-15
9	4. Total Net Worth	6	2	16-25
10	F. Return on Equity Capital, dollar amount	6	2	26-35
	1. Calculation of Lessee Equity Capital Gain:			
11	a. Total Cost, column 1, (land)	7	2	36-45
12	Total Cost, column 4, (total)	7	2	46-55
13	b. Less Unpaid Balance, column 4 (total)	7	2	56-65

Georgia, 1971 and 1972

Variable #	Variable Name	Page	Card	Column
	2. Calculation of Depreciation on Equity Capital Gain:			
14	a. Equity Capital Gain, column 3, (total)	7	2	66-75
15	b. Depreciation Expense, column 3, (total)	7	3	6-15
	B. Amount Paid on the Lease, Rental, or Franchise			
16	1. Land	8	3	16-25
17	4. Total	8	3	26-35
18	Length of Reporting Period 12 months = blank 11 months = 11 1 month = 1	Top of page 1	3	36-45

3. Coding Form 3: Georgia Data, 1973.

Variable #	Variable Name	Page or Schedule	Card	Column
1	Type of Ownership: Proprietorship for profit: = 0 Partnership for profit: = 1 Corporation for profit: = 2 Religious = 3 Governmental = 4 Fraternal = 5 Missing = 6	A	1	6
	Bed-days available:			
2	Skilled	Line C, A	1	7-15
3	Non-Skilled	Line C, A	1	16-25
	Inpatient Days:			
4	Skilled	Line D, A	1	26-35
5	Non-Skilled	Line D, A	1	36-45
6	Patient Revenues - Skilled Care	Line 1a, B	1	46-55
7	Patient Revenues - Non-Skilled Care	Line 1b, B	1	56-65
8	Net Patient Revenues	Line 3, B	1	66-75
9	Total Other Income	Line 18, B	2	7-15
10	Net Income (or Loss) for the period	Line 24, B	2	16-25
11	Cash	Column 1, Line 1, C	2	26-35
12	Inventory	Column 1 Line 6, C	2	36-45
13	Current Assets, Total	Column 1 Line 10, C	2	46-55
14	Land	Column 1 Line 11, C	2	56-65
15	Accumulated Depreciation	Column 1, C Add: Line 13 Line 15 Line 17 Line 19 Line 21	2	66-75
16	Total Fixed Assets	Column 1 Line 23	3	7-15

Variable #	Variable Name	Page or Schedule	Card	Column
17	Total Assets	Column 1 Line 30, C	3	16-25
18	Current Liabilities, Total	Column 1 Line 38, C	3	26-35
19	Total Liabilities	Column 1 Line 45, C	3	36-45
20	If Corporation - Common Stock + Paid-in Capital	Column 1 Line 46, C	3	46-55
21	If Proprietorship or Partnership - Contributed Capital	Column 1 Line 46, C	3	56-65
22	Retained Earnings, if available	Column 1 Line 46, C	3	66-75
23	Current Period Earnings, if available	Column 1 Line 46, C	4	7-15
24	Total Capital	Column 1 Line 47, C	4	16-25
25	Rent	Column 3 Line 8, D	4	26-35
26	Depreciation Expense	Column 3 Lines 10-11, D	4	36-45
27	Interest Expense	Column 3 Line 18, D	4	46-55
	Payment Rates in Effect on Last Day of Fiscal Year			
28	Private Patients/monthly	R	4	56-65
29	Medicare/monthly	R	4	66-75
30	Medicaid/monthly	R	5	7-15
31	Length of Reporting Period	Top of page 1	5	16-25
	12 months = blank 11 months = 11 1 month = 1			
	Patient Census Report:			
32	Year to date, Private	Census Report	5	26-35
33	Medicare	Census Report	5	36-45
34	Agency 3 (Medicaid)	Census Report	5	46-55

4. Coding Form 4: Georgia Data, 1974 and 1975.

Variable #	Variable Name	Page or Schedule	Card	Column
1	Type of Ownership: Proprietorship for profit: = 0 Partnership for profit: = 1 Corporation for profit: = 2 Religious = 3 Governmental = 4 Fraternal = 5 Missing (other) = 6	Cover or Schedule A	1	6
	Bed-days Available:			
2	Skilled	Line C, A	1	7-15
3	Non-Skilled	Line C, A	1	16-25
	Bed-days Occupied:			
4	Skilled Medicaid	Line d.1, A	1	26-35
5	Unskilled Medicaid	Line d.1, A	1	36-45
6	Skilled Total	Line d.2, A	1	46-55
7	Unskilled Total	Line d.2, A	1	56-65
8	Patient Revenues - Skilled Care	Line 1.a, B	1	66-75
9	Patient Revenues - Non-Skilled Care	Line 1.b, B	2	7-15
10	Net Patient Revenues	Line 3, B	2	16-25
11	Total Other Income	Line 18, B	2	26-35
12	Net Income (or Loss) for the period	Line 24, B	2	36-45
13	Cash	Column 1 Line 1, C	2	46-55
14	Inventory	Column 1 Line 6, C	2	56-65
15	Current Assets, Total	Column 1 Line 10, C	2	66-75
16	Land	Column 1 Line 11, C	3	7-15
17	Accumulated Depreciation	Column 1, C Add: Line 13 Line 15 Line 17 Line 19 Line 21 or Schedule L	3	16-25

Georgia, 1974 and 1975

Variable #	Variable Name	Page or Schedule	Card	Column
18	Total Fixed Assets	Column 1, C Line 23	3	26-35
19	Total Assets	Column 1 Line 30, C	3	36-45
20	Current Liabilities	Column 1 Line 38, C	3	46-55
21	Total Liabilities	Column 1 Line 45, C	3	56-65
22	If Corporation - Common Stock + Paid-in Capital	Column 1 Line 46, C	3	66-75
23	If Proprietorship or Partnership - Contributed Equity	Column 1 Line 46, C	4	7-15
24	Retained Earnings, if available	Column 1 Line 46, C	4	16-25
25	Current Period Earnings, if available	Column 1 Line 46, C	4	26-35
26	Total Capital	Column 1 Line 47, C	4	36-45
27	Rent	Column 3 Line 8, D	4	46-55
28	Depreciation Expense	Column 3 Lines 10-11, D	4	56-65
29	Interest Expense	Column 3 Line 18, D	4	66-75
	Payment Rates in Effect on Last Day of Fiscal Year:			
30	Private	Schedule O	5	7-15
31	Medicare	Schedule O	5	16-25
32	Medicaid	Schedule O	5	26-35
33	Length of Reporting Period 12 months = blank 11 months = 11 1 month = 1	Top of page 1	5	36-45
34	Total Private Revenue	Revenue Schedule 1/2	5	46-55
35	Total Welfare Revenue or Total Medicaid Revenue	Revenue Schedule 1/2	5	56-65
36	Total Medicare Revenue	Revenue Schedule 1/2	5	66-75
37	Total Medicare Revenue (Outpatient)	Revenue Schedule 1/2	6	7-15

5. Coding Form 5: New York Data, for Profit Facilities, 1971-1973.

Identification of New York Data

The first five characters on each card are used to identify the facility, reporting period, and card number in each case.

Columns 1-3: the facility identification number

Column 4: the year of the report (1, 2, 3, 4, 5)

Column 5: the card number (1-5)

Column 80 is a state specific variable; New York = 2.

Raw Data Variable Number	Variable Name	Location of Data on Report	Card	Column
1	Type of Ownership: (40) Missing = 0 Individual = 1 Partnership = 2 Corporation = 3	1	1	6
2	Classification of Facility: (41) Missing = 0 Nursing Home Only = 1 Nursing Home Section of Hospital = 2 Combined Nursing Home and Health Related Facility = 3 Health Related Facility Only = 4 Other = 5	1	1	7
	Certified Bed Capacity: (1a)	4	1	
3	Total (column 1)	4	1	8-15
4	Nursing Home Service (column 2)	4	1	16-25
5	Other (column 4)	4	1	26-35
	Care Provided: (3)			
6	Medicaid (column 1)	4	1	36-45
7	Medicare (column 1)	4	1	46-55
8	Total (column 1)	4	1	56-65
9	Cash (1)	11	1	66-75
10	Sum of Patient's Accounts Rec. (2) plus Other Accounts Rec. (3)	11	2	7-15
11	Inventories (4)	11	2	16-25
12	Total Current Assets (13)	11	2	26-35
13	Land (14)	11	2	36-45
14	Accumulated Depreciation and Accumulated Amortization - sum of figures in parentheses, lines 15 through 20	11	2	46-55

New York, 1971-1973

Variable #	Variable Name	Page	Card	Column
15	Total Fixed Assets (25)	11	2	56-65
16	Total Assets (40)	11	2	66-75
17	Accounts Payable - sum of lines 41 through 43 (inclusive)	12	3	7-15
18	Accrued Payroll - sum of lines 44, 45, and 46	12	3	16-25
19	Accrued Income Taxes (47)	12	3	26-35
20	Total Current Liabilities (57)	12	3	36-45
21	Total Liabilities (64)	12	3	46-55
22	Total Equity (69)	12	3	56-65
	Changes in Total Equity:			
23	Balance at Beginning of Period	13	3	66-75
24	Excess over Expenditures or Revenues - line 2 or line 10	13	4	7-15
25	Additional Capital Contributed (3)	13	4	16-25
26	Withdrawal of Capital (11)	13	4	26-35
27	Total Revenue (line A)	13	4	36-45
28	Net Income or Deficit (line C)	13	4	46-55
	Analysis of Total Revenue			
29	Medicaid	13	4	56-65
30	Medicare	13	4	66-75
31	Private Patients	13	5	7-15
32	Total	13	5	16-25
33	Depreciation - sum of lines 48 through 51 (inclusive)	17	5	26-35
34	Interest - sum of lines 53 through 54	17	5	36-45
35	Rent - sum of lines 58 through 61 (inclusive)	17	5	46-55
36	Amortization - sum of lines 52 and 62	17	5	56-65
37	Number of Months Covered by Report 12 months = blank 11 months = 11 1 month = 1		5	66-70

6. Coding Form 6: New York Data for Profit Facilities, 1974.

Variable #	Variable Name	Page	Card	Column
1	Type of Ownership: Missing = 0 Individual = 1 Partnership = 2 Corporation = 3 Governmental = 4 Voluntary = 5	1	1	6
2	Classification of Facility: Missing = 0 Nursing Home Only = 1 Nursing Home Section of Hospital = 2 Combined Nursing Home and Health Related Facility = 3 Health Related Facility Only = 4 Other = 5	1	1	7
	Certified Bed Capacity: (1a)			
3	Total (line a, column 1)	4	1	8-15
4	Nursing Home Service (line a, column 2)	4	1	16-25
5	Other (line a, column 4)	4	1	26-35
	Care Provided: (3)			
6	Medicaid (A, column 1)	4	1	36-45
7	Medicare (B, column 1)	4	1	46-55
8	Total (D, column 1)	4	1	56-65
9	Cash (1)	13	1	66-75
10	Accounts Receivable - sum of lines 2 and 3	13	2	7-15
11	Inventories (4)	13	2	16-25
12	Total Current Assets (11)	13	2	26-35
13	Land (12)	13	2	36-45
14	Accumulated Depreciation - sum of lines 13 through 18 (inclusive)	13	2	46-55
15	Total Fixed Assets (22)	13	2	56-65
16	Total Assets (35)	13	2	66-75
17	Accounts Payable - sum of lines 36 through 38 (inclusive)	14	3	7-15
18	Accrued Payroll - sum of lines 39 and 40	14	3	16-25
19	Accrued Taxes Payable - sum of lines 41 and 42	14	3	26-35

New York, 1974

Variable #	Variable Name	Page	Card	Column
20	Total Current Liabilities (50)	14	3	36-45
21	Total Liabilities (58)	14	3	46-55
	Changes in Total Equity			
22	Balance at End of Prior Fiscal Year	15	3	56-65
23	Excess over Expenditures or Revenues, line 2 or line 11	15	3	66-75
24	Additional Capital Contributed (3)	15	4	7-15
25	Total Revenue (line A)	15	4	16-25
26	Net Income or Deficit (line C)	15	4	26-35
	Analysis of Total Income			
27	Medicaid (sum of 3 listings)	15	4	36-45
28	Medicare	15	4	46-55
29	Private Patients	15	4	56-65
30	Total	15	4	66-75
31	Depreciation - sum of lines 47 through 50 (inclusive)	19	5	6-15
32	Amortization - sum of lines 51 and 61	19	5	16-25
33	Interest - sum of lines 52 and 53	19	5	26-35
34	Rent - sum of lines 57 through 60	19	5	36-45
35	Number of Months Covered by Report	1	5	46-50

12 months = blank
11 months = 11

1 month = 1

7. Coding Form 7: New York Data, for Profit Facilities, 1975.

Variable #	Variable Name	Page	Card	Column
1	Type of Ownership: Missing = 0 Individual = 1 Partnership = 2 Corporation = 3	1	1	6
2	Classification of Facility: Missing = 0 Nursing Home Only = 1 Nursing Home Section of Hospital = 2 Combined Nursing Home and Health Related Facility = 3 Health Related Facility Only = 4 Health Related Facility Section of Hospital = 5	1	1	7
	Bed Capacity: (A, 1)			
3	Total (line 1, column 1)	4	1	8-15
4	Nursing Home (line 1, column 2)	4	1	16-25
5	Other (line 1, column 4)	4	1	26-35
	Care Provided: (D)			
6	Medicaid (D1, column 1)	4	1	36-45
7	Medicare (D2, column 1)	4	1	46-55
8	Total (D4, column 1)	4	1	56-65
9	Cash (1)	15	1	66-75
10	Accounts Receivable - sum of lines 2 and 3	15	2	7-15
11	Inventories (4)	15	2	16-25
12	Total Current Assets (11)	15	2	26-35
13	Land (12)	15	2	36-45
14	Accumulated Depreciation - sum of entries on lines 13 through 18	15	2	46-55
15	Total Fixed Assets (22)	15	2	56-65
16	Total Assets (35)	15	2	66-75
17	Accounts Payable - sum of lines 36 through 38	16	3	7-15
18	Accrued Payroll - sum of lines 39 and 40	16	3	16-25
19	Accrued Taxes - sum of lines 41 and 42	16	3	26-35
20	Total Current Liabilities (50)	16	3	36-45

New York, 1975

Variable #	Variable Name	Page	Card	Column
21	Total Liabilities (58)	16	3	46-55
	Changes in Total Equity			
22	Balance at End of Prior Fiscal Year (1)	17	3	56-65
23	Excess over Expenditures or Revenue either line 2 or line 11	17	3	66-75
24	Additional Capital Contributed or Withdrawal of Capital, line 3 or line 12	17	4	7-15
25	Total Revenue (A)	17	4	16-25
26	Net Income or Deficit (c)	17	4	26-35
	Analysis of Total Revenue			
27	Medicaid (sum of 3 entries)	17	4	36-45
28	Medicare	17	4	46-55
29	Private Patients	17	4	56-65
30	Total	17	4	66-75
31	Depreciation - sum of lines 34 through 37	22	5	7-15
32	Amortization (38)	22	5	16-25
33	Interest - sum of lines 39 and 40	23	5	26-35
34	Rent - sum of lines 44 through 47	23	5	36-45
35	Amortization (48)	23	5	46-55
36	Number of Months Covered by Report 12 months = blank 11 months = 11 1 month = 1	1	5	56-60

3. Coding Form 8: New York Data, Nonprofit Facilities, 1971-1973.

Raw Data Variable Number	Variable Name	Location of Data on Report	Card	Column
1	Type of Ownership: (40)	1	1	6
	Missing = 0			
	Individual = 1			
	Partnership = 2			
	Corporation = 3			
	Governmental = 4			
	Voluntary = 5			
2	Classification of Facility: (41)	1	1	7
	Missing = 0			
	Nursing Home Only = 1			
	Nursing Home Section of Hospital = 2			
	Combined Nursing Home and Health Related Facility = 3			
	Health Related Facility Only = 4			
	Other = 5			
	Certified Bed Capacity: (1a)			
3	Total (column 1)	4	1	8-15
4	Nursing Home Service (column 2)	4	1	16-25
5	Other (column 4)	4	1	26-35
	Care Provided: (3)			
6	Medicaid (column 1)	4	1	36-45
7	Medicare (column 1)	4	1	46-55
8	Total (column 1)	4	1	56-65
9	Cash (1) + (58)	11+12	1	66-75
10	Sum of Patient's Accounts Receivable, (line 5) plus Other Accounts Receivable (line 8)	11	2	7-15
11	Inventories (10)	11	2	16-25
12	Total Current Assets (total of lines 1 through 12, plus line 58)	11+12	2	26-35
13	Land (33)	12	2	36-45
14	Accumulated Depreciation and Amortization (lines 35 and 38)		2	46-55
15	Total Fixed Assets (46) + any fixed assets on page 11, line 13	12 11	2	56-65
16	Total Assets: (18) less (17) + (46) less (45) + (63) less (62)	12	2	66-75
17	Accounts Payable (19)	11	3	7-15

New York, 1971-1973

Variable #	Variable Name	Page	Card	Column
18	Accrued Payroll (20)	11	3	16-25
19	Not Applicable		3	26-35
20	Total Current Liabilities (57): Sum of (19) through (26)	12	3	36-45
21	Total Liabilities: lines 19 through 29, 47 through 49	11,12	3	46-55
22	Total Equity: lines 30 and 31 plus lines 53 through 57 plus line 70	11,12	3	56-65
	Changes in Total Equity:			
23	Balance at Beginning of Period General + Temporary + Endowment + Plant	13	3	66-75
24	Excess over Expenditures or Revenues. General + Temporary + Endowment + Plant. Line 2 or line 12	13	4	7-15
25	Additional Capital Contributed. General + Temporary + Endowment + Plant. (4)	13	4	16-25
26	Withdrawal of Capital. General + Temporary + Endowment + Plant. (17) or (18)	13	4	26-35
27	Total Revenue (line A)	13	4	36-45
28	Net Income or Deficit (line C)	13	4	46-55
	Analysis of Total Revenue:			
29	Medicaid	13	4	56-65
30	Medicare	13	4	66-75
31	Private Patients	13	5	7-15
32	Total	13	5	16-25
33	Depreciation: deduct last year's coding number 14 from this year's		5	26-35
34	Not Applicable		5	36-45
35	Not Applicable		5	46-55
36	Not Applicable		5	56-65
37	Number of Months Covered by Report		5	69-70

12 months = blank
11 months = 11

1 month = 1

9. Coding Form 9: New York Data, Nonprofit Facilities, 1974.

Variable #	Variable Name	Page	Card	Column
1	Type of Ownership: Missing = 0 Individual = 1 Partnership = 2 Corporation = 3 Governmental = 4 Voluntary = 5	1	1	6
2	Classification of Facility: Missing = 0 Nursing Home Only = 1 Nursing Home Section of Hospital = 2 Combined Nursing Home and Health Related Facility = 3 Health Related Facility Only = 4 Other = 5	1	1	7
	Certified Bed Capacity: (1a)			
3	Total (line a, column 1)	4	1	8-15
4	Nursing Home Service (line a, column 2)	4	1	16-25
5	Other (line a, column 4)	4	1	26-35
	Care Provided: (3)			
6	Medicaid (A, column 1)	4	1	36-45
7	Medicare (B, column 1)	4	1	46-55
8	Total (D, column 1)	4	1	56-65
9	Cash (1) + (59)	13,14	1	66-75
10	Accounts Receivable: sum of lines (5) and (8)	13	2	7-15
11	Inventories (10)	13	2	16-25
12	Total Current Assets: lines (1) through (12) + (59)	13,14	2	26-35
13	Land:(14) + (33)	13,13	2	36-45
14	Accumulated Depreciation:(14) + (35) + (38)	13	2	46-55
15	Total Fixed Assets:(33) through (41) + (44) + Any Fixed Assets in (13)	13,13	2	56-65
16	Total Assets:(18) less (17) + (47) less (46) + (64) less (63)	13,14	2	66-75
17	Accounts Payable (19)	13	3	7-15
18	Accrued Payroll (20)	13	3	16-25

New York, 1974

Variable #	Variable Name	Page	Card	Column
19	Accrued Taxes Payable (21)	13	3	26-35
20	Total Current Liabilities: sum of (19) through (26)	13	3	36-45
21	Total Liabilities: (19) through (26) + (48) through (51)	13,14	3	46-55
	Changes in Total Equity:			
22	Balance at Beginning of Period	15	3	56-65
23	Excess over Expenditures *or* Revenues, line 2 or line 12, sum of General + Temporary + Plant + Permanent	15	3	66-75
24	Additional Capital Contributed (4), sum of General + Temporary + Plant + Permanent *or* Withdrawal of Capital (17), sum of General + Temporary + Plant + Permanent	15	4	7-15
25	Total Revenue (line A)	15	4	16-25
26	Net Income or Deficit (line C)	15	4	26-35
	Analysis of Total Income:			
27	Medicaid (sum of 3 listings)	15	4	36-45
28	Medicare	15	4	46-55
29	Private Patients	15	4	56-65
30	Total	15	4	66-75
31	Depreciation: difference between this period's accumulated depreciation (#14) and last period's		5	7-15
32	Not Applicable	19	5	16-25
33	Not Applicable	19	5	26-35
34	Not Applicable	19	5	36-45
35	Number of Months Covered by Report 12 months = blank 11 months = 11 1 month = 1	1	5	46-50

10. Coding Form 10: New York Data Nonprofit Facilities, 1975.

Variable #	Variable Name	Page	Card	Column
1	Type of Ownership: (36) Missing = 0 Individual = 1 Partnership = 2 Corporation = 3 Governmental = 4 Voluntary = 5 Church = 6 Nonprofit Corporation = 7 Other Nonprofit = 8	1	1	6
2	Classification of Facility: Missing = 0 Nursing Home Only = 1 Nursing Home Section of Hospital = 2 Combined Nursing Home and Health Related Facility = 3 Health Related Facility Only = 4 Health Related Facility Section of Hospital = 5	1	1	7
	Bed Capacity: (A, 1)			
3	Total (line 1, column 1)	4	1	8-15
4	Nursing Home (line 1, column 2)	4	1	16-25
5	Other (line 1, column 4)	4	1	26-35
	Care Provided: (D)			
6	Medicaid (D1, column 1)	4	1	36-45
7	Medicare (D2, column 1)	4	1	46-55
8	Total (D4, column 1)	4	1	56-65
9	Cash (1) + (59)	15+16	1	66-75
10	Accounts Receivable: sum of lines 5 and 8	15	2	7-15
11	Inventories (10)	15	2	16-25
12	Total Current Assets: sum of (1) through (13) + (59)	15,16	2	26-35
13	Land (33)	15	2	36-45
14	Accumulated Depreciation: any accumulated depreciation in (14) + (35) and (38)	15	2	46-55
15	Total Fixed Assets: any fixed assets in (14) + (33) through (41) and (44)	15	2	56-65

New York, 1975

Variable #	Variable Name	Page	Card	Column
16	Total Assets: (18) less (17) + (47) less (46) + (64) less (63)	15	2	66-75
17	Accounts Payable (19)	15	3	7-15
18	Accrued Payroll (20)	15	3	16-25
19	Accrued Taxes (21)	15	3	26-35
20	Total Current Liabilities (19) through (26)	15	3	36-45
21	Total Liabilities: (19) through (26) + (48) through (51)	15	3	46-55
	Changes in Total Equity:			
22	Balance of End of Prior Fiscal Year (1) General + Temporary + Plant + Permanent Endowment	17	3	56-65
23	Excess over Expenditures or Revenue, either line 2 or line 12. General + Temporary + Plant + Permanent Endowment	17	3	66-75
24	Additional Capital Contributed or Withdrawal of Capital, line 4 or line 17. General + Temporary + Plant + Permanent Endowment	17	4	7-15
25	Total Revenue (A)	17	4	16-25
26	Net Income or Deficit (c)	17	4	26-35
	Analysis of Total Revenue:			
27	Medicaid (sum of 3 entries)	17	4	36-45
28	Medicare	17	4	46-55
29	Private Patients	17	4	56-65
30	Total	17	4	66-75
31	Depreciation: difference between this period's accumulated depreciation (#14) and last period's #14		5	7-15
32	Not Applicable		5	16-25
33	Not Applicable		5	26-35
34	Not Applicable		5	36-45
35	Not Applicable		5	46-55
36	Number of Months Covered by Report 12 months = blank 11 months = 11 1 month = 1	1	5	56-60

11. Coding Form 11: Washington Data, 1971.

Identification of Washington Data

The first five characters on each card are used to identify the facility, reporting period, and card number in each case.

Columns 1-3: the facility identification number

Column 4: the year of the report (1, 2, 3, 4, 5)

Column 5: the card number (1-4)

Column 80 is a state specific variable; Washington = blank.

1971

Raw Data Variable Number	Variable Name	Location of Data on Report	Card	Column
1	Type of Operation: Sole Partnership = 0 Partnership = 1 Corporation = 2 Nonprofit Church = 3 Government = 4 Nonprofit, other = 5 Missing = 9	A-3	1	6
2	Total patient days, Public Assistance patients less Boarding Home (1a)	A-4	1	7-15
3	Total patient days, Medicare patients	A-4	1	16-25
4	Total patient days, Private Pay patients	A-4	1	25-35
5	Nursing Home days, Public Assistance patients (2b)	A-4	1	36-45
6	Total Capacity days	A-4	1	46-55
7	Current Assets	B-1	1	56-65
8	Land	B-1	1	66-75
9	Accumulated Depreciation Line 12, column 2	B-1	2	7-15
10	Total of Long Term Assets less Depreciation Line 12, column 3	B-1	2	16-25
11	Total Assets	B-1	2	26-35
12	Current Liabilities	B-1	2	36-45
13	Total Liabilities	B-1	2	46-55
14	Net Worth (Equity)	B-1	2	56-65

Washington, 1971

Variable #	Variable Name	Page	Card	Column
15	Total Revenue	B-2	3	66-75
16	Number of Months Covered by Report 12 months = blank 9 months = 9 1 month = 1	B-3	3	7
17	Net Income (or Loss)	B-2	3	8-15
18	Patient Revenue: Public Assistance patients less Boarding Home (1a)	B-3	3	16-25
19	Patient Revenue: Medicare patients	B-3	3	26-35
20	Patient Revenue: Private Pay patients	B-3	3	36-45
21	Depreciation of Building and Equipment Sum of lines 37 and 38	B-4b	3	46-55
22	Rental of Plant and Equipment Sum of lines 42 and 43	B-4b	3	56-65
23	Interest Expense Line 71	B-4c	3	66-75

12. Coding Form 12: Washington Data, 1973.

Variable #	Variable Name	Page	Card	Column
1	Type of Operation: Individual = 0 Partnership = 1 Corporation = 2 Nonprofit Church = 3 Government = 4 Nonprofit, other = 5 Missing = 9	1	1	6
2	Cash	2	1	7-15
3	Inventories	2	1	16-25
4	Total Current Assets	2	1	26-35
5	Accumulated Depreciation and Amortization	2	1	36-45
6	Total Assets	2	1	46-55
7	Total Current Liabilities	3	1	56-65
8	Total Equity	3	1	66-75
9	Total Operating Income	5	2	6-15
10	Interest	5	2	16-25
11	Net Earnings (loss)	5	2	26-35
12	a) Sole Proprietor or Partnership Capital Withdrawals Balance, end of year	6	2	36-45
	b) Nonprofit Organization Leave blank	6	2	36-45
	c) Corporation Capital Stock Balance, end of year	7	2	36-45
13	a) Sole Proprietor or Partnership Capital Contributions Balance, end of year	6	2	46-55
	b) Nonprofit Organization Capital Contributions Balance, end of year	6	2	46-55
	c) Corporation Paid in Capital Balance, end of year	7	2	46-55

Washington, 1973

Variable #	Variable Name	Page	Card	Column
14	a) Sole Proprietor or Partnership Retained Earnings Balance, beginning of prior period	6	2	56-65
	b) Nonprofit Organization Retained Earnings Balance, beginning of prior period	6	2	56-65
	c) Corporation Retained Earnings Balance, beginning of prior period	7	2	56-65
15	a) Sole Proprietor or Partnership Retained Earnings Balance, end of current year	6	2	66-75
	b) Nonprofit Organization Retained Earnings Balance, end of current year	6	2	66-75
	c) Corporation Retained Earnings Balance, end of current year	7	2	66-75
16	Depreciation, Building and Equipment Sum of lines 25 and 26	13	3	6-15
17	Amortization Expense Line 27	13	3	16-25
18	Rental or Lease of Plant and/or Equipment	13	3	26-35
19	Maximum patient days for the year Line 3, column 1 (total licensed beds)	16	3	36-45
20	Private actual patient days for the year Line 6, column 1	16	3	46-55
21	If "Medicare" is listed, then actual patient days for year	16	3	56-65

Washington, 1973

Variable #	Variable Name	Page	Card	Column
22	Medical Recipients (state): actual patient days for year Line 7, sum of columns 2 (Class 1) and 3 (Class 2)	16	4	66-75
23	Medical Recipients (state) Line 7, column 4 (ICF)	16	4	6-15
24	Less: Portion paid by Medical Recipient (Private Pay) Column 1	16	4	16-25
25	Net Revenues from Medical Recipient (state) patients Column 1	16	4	26-35
26	Number of Months Covered by Report 12 months = blank 11 months = 11 1 month = 1	5	4	36-45

13. Coding Form 13: Washington Data, 1974 and 1975.

Variable #	Variable Name	Page	Card	Column
1	Type of Operation: Individual = 0 Partnership = 1 Corporation = 2 Nonprofit Church = 3 Government = 4 Nonprofit, other = 5 Missing = 9	1	1	6
2	Cash	8	1	17-25
3	Inventories	8	1	26-35
4	Total Current Assets	8	1	36-45
5	Accumulated Depreciation and Amortization	8	1	46-55
6	Total Assets	8	1	56-65
7	Total Current Liabilities	9	1	66-75
8	Total Equity	9	2	6-15
9	Patient Revenue, Private	10	2	16-25
10	Patient Revenue, Medicare	10	2	26-35
11	Patient Revenue, Medical Recipient (Medicaid)	10	2	36-45
12	Total Revenue	10	2	46-55
13	Excess of Revenues (Expenses)	10	2	56-65
14	a) Sole Proprietor or Partnership Capital Withdrawals Balance, end of year	11	2	66-75
	b) Nonprofit Corporation Leave blank	11	2	66-75
	c) Corporation Capital Stock Balance, end of year	12	2	66-75
15	a) Sole Proprietor or Partnership Capital Contributions Balance, end of year	11	3	6-15
	b) Nonprofit Corporation Capital Contributions Balance, end of year	11	3	6-15
	c) Corporation Paid-in Capital Balance, end of year	12	3	6-15

Washington, 1974 and 1975

Variable #	Variable Name	Page	Card	Column
16	a) Sole Proprietor or Partnership Retained Earnings Balance, end of year	11	3	16-25
	b) Nonprofit Corporation Net Excess of Revenue Balance, end of year	11	3	16-25
	c) Corporation Retained Earnings Balance, end of year	12	3	16-25
17	Maximum patient days	13	3	26-35
18	Actual Private Patient days	13	3	36-45
19	Actual Medicare patient days, total	13	3	46-55
20	Actual Medical Recipient days, total (ICF)	13	3	56-65
21	Actual Medical Recipient days, total (SNF)	13	3	66-75
22	Total actual patient days for year	13	4	6-15
23	Depreciation Sum of lines 6 and 7 Balance per books	26	4	16-25
24	Amortization Expenses Balance per books	26	4	26-35
25	Interest Balance per books	26	4	36-45
26	Rental or Lease of Plant and/or Equipment Balance per books	26	4	46-55
27	Balance Due Provider, total	35	4	56-65
28	Number of Months Covered by Report 12 months = blank 11 months = 11 1 month = 1	9	4	66-75

APPENDIX C:

RISK AND RATE OF RETURN STUDY DATA

RISK AND RATE OF RETURN STUDY DATA

The purposes of the Risk and Rate of Return Study were to estimate the degree of risk attached to investment in publicly traded nursing home corporations; to estimate the relationship between accounting and market measures of risk; to use this relationship to estimate the risk attached to investment in a sample of closely held nontraded proprietary nursing homes; and in the analysis, to relate risk to estimated rates of return. In all of these, the study was seeking answers to questions not previously asked in the area of long-term care. Consequently, a major part of the effort has gone into locating, collecting, and editing entirely new data.

The data required for the 1970-75 period included the list of publicly traded corporations, their financial records, stock prices and dividend payments; the rates of return on diversified portfolios; the rates paid on risk-free assets; and financial data from the privately held corporations in the four states included in the State Studies (see Appendix B).

A. Locating and Collecting Data

The Risk Study component of this project required locating and collecting large amounts of microdata from various sources on publicly traded nursing home corporations. Data were located and collected in the following areas:

- Publicly traded nursing home corporations.
- Financial records.
- Stock prices and dividend data.
- Market rates of return.
- Yield on risk-free assets.
- Financial data for privately held nursing homes.

1. Publicly Traded Nursing Home Corporations

The task of identifying the publicly traded firms with substantial nursing home operations in the 1970-75 period consisted of two steps. The first step was to create a master list of companies in the long-term and health care industry. The second step was to determine which firms should be included in the study.

The Master List. The master list of corporations was developed from four basic sources, although other sources were investigated. The primary source for identifying corporations with nursing home operations was the annual directory of companies required to file annual reports with the Securities and Exchange Commission, especially the 1976 volume [16].[4] The SEC Directory "includes companies with securities listed on national securities exchanges, companies with securities traded over the counter which are registered under Section 12 (g) of the Securities Exchange Act, and certain companies required to file pursuant to Section 15 (d) of the Securities Exchange Act...". Certain organizations are excluded from the Directory, the most important of which are governments and political subdivisions. These firms and organizations were not relevant to this study. However, all firms listed in the Directory under Standard Industrial Classification #801 (Medical and Other Health Services) were included in the master list. These annual directories identified 142 corporations which potentially supplied nursing home services.

Another source of firms for the master list was a compilation of publicly traded companies made by the American Health Care Association [1]; 21 corporations were selected from this compilation. In addition, we also examined a 1974 Morton Research Corporation report, The Nursing Home Industry; An Economic and Financial Analysis [8]. The names of four corporations not listed elsewhere were obtained from this report. Finally, five more firms were found in a 1976 Dun & Bradstreet study, "Financial Structure Study: Nursing Home Industry," [3]. Together these four sources provided the names of 172 firms for the master list.

In addition to the above, five additional sources were examined. These included "COMPUSTAT Listings," prepared by Investors Management Sciences, Inc. [4]; a report for the American Health Care Association by the Battelle Health Care Study Center [5]; a compilation of multifacility companies obtained from Hillhaven, Inc.; Moody's Industrial Manual for 1976 [6]; and the 1976 Standard and Poor's Register of Corporations, Vol. 1, [15]. These sources frequently confirmed earlier selections, but added no new corporation names to the master list.

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[4] Reference numbers refer to the list at the end of this Appendix.

The master list of 1972 firms is shown in Table C-1. The first column of this table lists the corporate names of the 172 firms. The second column cites the original and principal confirmational sources in which the firm was located. Column three identifies whether or not the firm is a domestic, independent entity. Columns four to six state the percentage of the firm's revenue derived from nursing home operations, according to various sources which are discussed below. Finally, column seven indicates which of the firms are proprietorships or "privately held" corporations.

Excluding Irrelevant Entries. The master list of corporations contained some firms whose activities lay primarily outside of nursing home operations, and even some were found to have no nursing homes. Others were privately held corporations, subsidiaries of other corporations, or in a few cases, international corporations. The following three criteria were applied to each of the 172 firms, and unless a firm satisfied each condition, that firm was excluded from the study group:

(i) The firm must be a domestic, independent entity. Both subsidiary corporations and foreign firms were excluded.

(ii) If the firm is diversified, nursing home operations must have constituted 40 percent or more of its total revenues.

(iii) The firm must be a publicly held corporation.

In establishing which firms on the master list satisfied all three conditions, it was necessary to identify: (1) firms in which the corporate names changed over the 1970-75 period, (2) independent nursing home facilities that merged to form publicly held corporations, and (3) firms that were otherwise taken over by existing corporations.

We contacted the treasurer's or comptroller's office in each firm on the master list by telephone, in order to verify the above conditions and circumstances. For each corporation we asked whether or not the firm was a domestic independent firm, whether or not it was a publicly held corporation, and what percentage of its revenues came from nursing home operations. We also used the telephone interviews to verify mergers and name changes. Some mergers and name changes were also found by tracing firms through issues of the SEC Directory of Companies [16], from 1970-75.

TABLE C-1

CHARACTERISTICS OF PUBLICLY HELD COMPANIES WITH NURSING HOME OPERATIONS, 1971-76

Name	Source[a]	Subsidiary or Foreign Based Corporation	Percent of Revenue from Nursing Homes: Telephone Survey	Percent of Revenue from Nursing Homes: Morton Report	Percent of Revenue from Nursing Homes: AHCA Listing	Privately Held
1. Aid, Inc.	A,C		20%	31%		
2. Alden Care Enterprises	A		99%			
3. Alliance Medical Industries	A		92%			
4. American Biomedical	A		5%			
5. American Care Centers	A,B,C			99%		
6. American Healthcare	B	X	23%			
7. American Health Services	A,B		<50%			
8. American Hospital Management	A					
9. American Medical Affiliates	A,B,C		95%	99%		
10. American Medical International (AMI)	A		0%		7%	
11. American Medicorp	A		0%			
12. American Medical Services	A,C		93%	99%		
13. Amerital Enterprises	A,B		99%			
14. Anta	A,C		30%[h]	93%		
15. Arex Industries	A		0%		31%	
16. Arthritis Clinics International	A	X				
17. Automated Medical Laboratories	A					
18. Autumn Hills Convalescent	B		99%			X
19. Belcor	B					X
20. Berkeley Bio-Engineering	A	[b]	52%			
21. Beverly Enterprises	A,C		99%	48%	49%	
22. Bethesda	B		99%			X
23. Biological Preservation	A	X				
24. Biomedical Resources	A		0%			
25. Biospherica	A		0%			
26. Bond, William	A	X	(8)			
27. Brookwood Medical Centers	A					
28. CM Corp.	B,C		90%	53%		X
29. CNA Financial (First Health Care)	C			2%		
30. C-V American	A,C		33%	20%		
31. Care Centers	A,B,C		99%		49%	
32. Care Corp.	A,C		86%			
33. Care Inns	A,B		99%[i]			
34. Carex International	A,B		99%			
35. Canco	A,C		23%[c]	18%		
36. Centennial Villas	A		90%			
37. Center for Laboratory Medicine	A		10%			
38. Century Medical	A					
39. Charter Medical	A,B,C		6%	14%		
40. Clorox	D		3%			
41. Commonwealth Industries	A,C		67%	32%		
42. Community Health Facilities (CHF)	A,C			93%		
43. Community Psychiatric Centers	A		0%			
44. Comprehensive Care	A,B		17%		96%	
45. Congeneric	A		95%			
46. Consolidated Medical Industries	A					
47. Continental Care Centers	A,B,C		99%			
48. Continued Care Facilities	A		0%		42%	
49. Coventry Care	A					
50. Crestwood Hospitals	B		99%			X

TABLE C-1

CHARACTERISTICS OF PUBLICLY HELD COMPANIES WITH NURSING HOME OPERATIONS, 1971-76

(continued)

Name	Source[a]	Subsidiary or Foreign Based Corporation	Percent of Revenue from Nursing Homes			Privately Held
			Telephone Survey	Morton Report	AHCA Listing	
51. Cybertek	A					
52. Damon	A		15%			
53. Dart Investment	A					
54. Data Lease Financial	C		4%			
55. Daxon	A					
56. Daytona Beach General Hospital	A		0%			
57. Dento Medical Industries	A					
58. Eden Park Management	B		99%			X
59. Educators Investment	A					
60. Enviromed	A					
61. Evangelical Lutheran Good Samaritan Soc.	B		99%			
62. Exception	A					
63. Extendicare Ltd.	C	X		72%		
64. Flagg	A,B,C			28%	50%	
65. Frawley Enterprises	D					
66. General Care	A,C		2%	90%		
67. General Health Services	A		0%			
68. General Hospital Services	A					
69. General Medical Centers	A					
70. Geriatrics	A,B,C		95%	85%		
71. Geriatric/Medical Centers	A,B,C		99%	80%	79%	
72. Gold Medallion	A,B,C		55%	37%		
73. Golden State Health Centers	A,C		95%	88%		
74. Guardian	A,B,C		90%	70%		
75. HMO International	A					
76. Health Delivery Systems	A		0%			
77. Healthco	A		0%		42%	
78. Healthgarde	A		0%			
79. Health Industries	D					
80. Health Services Centers	B		99%			X
81. Heritage Enterprises	B		80%			X
82. Hillhaven	A,B,C		85%	65%	67%	
83. Holiday Universal	A		0%			
84. Hospital Affiliates International	A					
85. Hospital Corp. of America	A					
86. Humana	A		0%			
87. Huntington Health Service	A,C		18%	15%		
88. Hy-Lond Enterprises	A,B,C		90%	90%		
89. Intermed	A		20%			
90. Intermountain Laboratories	A					
91. International Clinical Lab.	A					
92. International Funding	A					
93. King James Extended Care	A,C		95%	100%		
94. Kingsford	A	X	0%[g]	19%		
95. Klopstad, John B.	B		99%			X
96. Leader Nursing Centers	B		65%			
97. Leisure Lodges	A,C	d	99%	100%		
98. Life Sciences	A		0%			
99. Lifestyle Companies	A,C		99%	100%		
100. Living/Learning Centers	A					

TABLE C-1

CHARACTERISTICS OF PUBLICLY HELD COMPANIES WITH NURSING HOME OPERATIONS, 1971-76

(continued)

Name	Source[a]	Subsidiary or Foreign Based Corporation	Percent of Revenue from Nursing Homes			Privately Held
			Telephone Survey	Morton Report	AHCA Listing	
101. Lutheran Hospitals & Homes Society	B		20%			
102. Madisonville Realty	A					
103. Major D	A					
104. Manor Care	A,C		88%	90%	89%	
105. M.E.D.	B	X	97%			
106. Medco Centers	A,B		90%			
107. Medenco	A		0%			
108. Medevco	A		0%			
109. Medfield	A					
110. Mediatrics	A		40%			
111. Medic-Home Enterprises	A,C			75%		
112. Medical Analytics	A					
113. Medical Services	A,B,C	e	99%	95%	96%	
114. Medicalodges	A,B,C		60%	80%		
115. Medicenters of America	A,C	X	64%	46%		
116. Medicheck	A					
117. Medix	A					
118. Medserco	A					
119. Memorial Nursing Centers of N.C.	B		80%			X
120. Merit	A		64%			
121. Metpath	A					
122. Metrocare	A,B,C		30%	30%	28%	
123. Metropolitan Health Care	A					
124. Mid American Nursing Centers	A,C		99%	99%	98%	
125. Miller's Merry Manor	B		99%			X
126. Monterey Life Systems (MLS)	A,B,C			50%	81%	
127. National Accommodations	A,B,C		30%	20%	20%	
128. National Health Enterprises	A,B,C		95%	37%	93%	
129. National Health Services	A,B			100%		
130. National Living Centers	A,C	X	15%	98%		
131. National Medical Care	A,C		5%	15%		
132. National Medical Enterprises	A,B,C		5%	9%	7%	
133. National Nursing Centers	A,B		99%		99%	
134. Nodaway Valley Packing	A		40%		81%	
135. North Central Health Services	B		55%			X
136. Northern Virginia Doctors Hospital (NVDH)	A		90%		14%	
137. Nuclear Research Associates	A					
138. Nursecare Health Centers	A,B		98%			
139. Nursecare International	B					
140. Nursing Home Managers	B		99%			
141. Occupational Center of Union County	A		0%			
142. Omni Research	A	X				
143. Omni Rx Health Systems	A		0%			
144. PMG	B					
145. Pacer Phoenix	A		90%			
146. Pacific Coast Medical Enterprises	A		1%			
147. Pill Industries	A					
148. Pioneer Nursing Centers	A,C	f		100%		
149. Professional Care Services	A,B,C		70%	48%		
150. Provincial House	A,C		35%	39%	33%	

TABLE C-1

CHARACTERISTICS OF PUBLICLY HELD COMPANIES WITH NURSING HOME OPERATIONS, 1971-76

(continued)

Name	Source[a]	Subsidiary or Foreign Based Corporation	Percent of Revenue from Nursing Homes			Privately Held
			Telephone Survey	Morton Report	AHCA Listing	
151. Purolator	D		2%			
152. Quality Care	A	X				
153. R.H. Medical Services	A,B		10%			
154. Ramada Inns	A,C		1%	11%		
155. Rembrandt Enterprises	A,C		76%		76%	
156. Retirement Living	A,B,C		60%	93%	93%	
157. Rite-Aid	C			2%		
158. Security Mortgage Investors	A	X				
159. Smoke Watchers International	A					
160. Sossin System	A		65%			
161. Sunnycrest Nursing Facilities	A,C		68%	60%		
162. Sunshine-Fifty	A				68%	
163. Telmed	A		0%			
164. Townco Medical Enterprises	A,C		50%		91%	
165. Tranquilaire Mental Health	A					
166. Turtle Creek Convalescent Centers	B		50%			
167. Unicare Services	A,C		35%	40%		
168. Vari-Care	A,B,C		95%	99%		
169. Villacenters	D	X				
170. WSC Group	A					
171. Wolfe Industries	A		7%			
172. Wyndon	A		90%			
Totals	-	13	-	-	-	12

[a] LEGEND:

A - Directory of Companies Required to File Annual Reports with SEC, June 30, 1976. [16].

B - American Health Care Association Listing of Multi-Facility Long-Term Care Corporations. [1].

C - 1974 Morton Research report, "The Nursing Home Industry: An Economic and Financial Analysis." [8].

D - Dun & Bradstreet. Financial Structure Study of the Nursing Home Industry, 1976. [3].

b - Berkeley Bio-Engineering merged into Monterey Life Systems on 12/13/75; for the period covered by the study Berkeley Bio-Engineering operated autonomously.

c - Nursing home revenues in 1976 constituted only 23% of gross revenues for Cenco, Inc., but were still the largest single source of revenue.

d - Leisure Lodges was acquired by Stephens, Inc. in 1976; for the period covered by the study, Leisure Lodges operated autonomously.

e - Medical Services merged into NEWCO on 10/15/75; for the period covered by the study, Medical Services operated autonomously.

f - Pioneer Nursing Centers was renamed Pacer Phoenix on 4/30/74.

g - Clorox acquired Kingsford Co. in 3/73; it later resold Kingsford Co. in 6/74.

h - Formed by reorganization of Four Seasons Nursing Centers of Four Seasons Equity Corporation in 1972. Four Seasons Equity became a wholly-owned subsidiary of Anta. Financial data for Anta are from 7/1/72 forward.

i - William Bond owns a system of nursing homes which it operated through its Care Inns Division until 2/1/71, at which time the company entered into a lease-management agreement with AMI, Inc.

The results of these inquiries, and the examination of the annual directories of the SEC [16] along with other sources [1, 8] are shown in Table C-1. Thirteen firms were either subsidiaries of larger corporations or were foreign corporations (totals to columns 3 and 7, Table C-1). Only 76 of the remaining 159 firms on the master list reported, or were found to receive, 40 percent or more of their gross revenue from nursing home operations. We were unable to classify 41 of the 159 firms. Either the information on these 41 corporations was not available in any of the published sources, or we were unable to locate and contact the firm and its appropriate official, or when reached by telephone, the firm refused to reveal the percentage of its revenue derived from nursing home operations. Finally, the list of firms was further reduced by 14 when privately held corporations were deleted.

In summary, the final list of firms that met the criteria for inclusion in the study consisted of 61 corporations, as listed in Table C-2. This number was reached through the following method:

Number of Firms		Composition of List
	172	Master list of corporations
less	13	Subsidiaries and foreign corporations
	159	Domestic, independent corporations
less	41	Refused information or revenue data unavailable
	118	Revenue data available
less	43	Very little or no revenue from nursing homes
	75	40 percent or more of income from nursing homes
less	14	Privately held corporations
	61	Study sample

2. Financial Records

The second task in locating and collecting data was to obtain detailed financial records on each of the 61 firms in the study sample. The source of the data was the 10-K forms that are filed with the Securities and Exchange Commission. We requested the 1975, 1973, and 1971 forms for each firm. Because form 10-K contains financial statement data for both the current and preceding year, the forms provided the necessary data for as many as six years for each firm in the study group.

Table C-2 shows the data received. Six years of information were obtained for 35 firms. The SEC was unable to provide any data for five corporations; two to four years of data were received for the remaining 21 firms. Of course, not all firms existed in all six years because of mergers, sales, and incorporations or because a firm may have become public after 1971. Some 10-K forms could not be located in the SEC file for several firms that did exist during the period.

All data necessary to construct the financial measures, which were examined in the analyses of risk and the rate of return, were extracted from the 10-K forms of each firm. This process typically required locating and coding 26 separate variables for each year in each 10-K report, as well as reviewing the reports to ensure that the data taken were not invalid because of extraordinary circumstances. The 10-K forms are lengthy and often complicated documents, so the extraction of the data was a major undertaking.

The description of the financial variables obtained from the 10-K forms is contained in Table C-3, along with the coding key by which the financial ratios were defined and constructed. Table C-4 shows the mean and standard deviation of each of the raw data variables. These numbers were calculated from a total of 136 reports representing the 56 firms for which we acquired detailed financial data.

3. Stock Prices and Dividend Data

Stock prices and dividend payments for each of the 61 firms listed in Table C-2 were required for the period from January 1971 to December 1976. Nursing home corporations are typically relatively small-scale operations; most frequently their stocks are traded "over-the-counter" instead of being bought and sold on one of the organized exchanges. Furthermore, nursing home corporations are often "thinly-held," that is, they have relatively few stockholders and are only occasionally traded. These circumstances greatly complicate the task of collecting stock price data for two primary reasons: (a) there are several sources of over-the-counter security price data but not one is complete, and (b) sources on stock transactions must be cross-checked because low volume of trading means that transaction prices are frequently omitted in any single compilation of stock sales.

TABLE C-2

SUMMARY OF DATA AVAILABILITY FOR 61 PUBLICLY HELD NURSING HOME CORPORATIONS, 1970-76

Firms Identified as Primarily Nursing Home Operations	Stock Price Availability			SEC Form 10-K Availability					
	Weekly	Monthly	Unusable or Not Found	70	71	72	73	74	75
Alden Care Enterprises		X		X	X	X	X	X	X
Alliance Medical Industries		X							
American Care Centers			X						
American Medical Affiliates	X			X	X	X	X	X	X
American Medical Services		X		X	X	X	X	X	X
Amerital Enterprises			X	X	X	X	X	X	X
Anta Corp.	X					X	X	X	X
Berkeley Bio-Engineering	X			X	X	X	X	X	X
Beverly Enterprises	X			X	X	X	X	X	X
Care Centers			X	X	X				
Care Corp.	X			X	X	X	X	X	X
Care Inns (William Bond, Inc.)	X			X	X	X	X	X	X
Carex International		X						X	X
Centennial Villas			X	X	X	X	X	X	X
Commonwealth Industries			X	X	X	X	X	X	X
Community Health Facilities	X					X	X	X	X
Comprehensive Care	X					X	X	X	X
Congeneric Corp.		X		X	X	X	X	X	X
Continental Care Centers	X					X	X	X	X
Continued Care Facilities	X			X	X	X	X	X	X
Flagg Industries			X			X	X		
General Care	X			X	X	X	X	X	X
Geriatrics	X			X	X	X	X		
Geriatric & Medical Centers	X			X	X	X	X	X	X
Gold Medallion	X			X	X	X	X	X	X
Golden State Health Centers		X		X	X	X	X	X	X
Guardian		X		X	X	X	X	X	X
Healthco			X					X	X
Hillhaven	X			X	X	X	X	X	X
Hy-Lond Enterprises		X		X	X	X	X	X	X
King James Extended Care		X		X	X	X	X	X	X
Leader Nursing Centers			X						
Leisure Lodges	X			X	X				
Lifestyle Companies	X			X	X	X	X	X	X
Manor Care	X			X	X	X	X	X	X
Medco Centers			X			X	X	X	X
Medic-Home Enterprises	X			X	X	X	X	X	X
Medical Services	X			X	X	X	X	X	X
Medicalodges		X				X	X	X	X
Merit Corp. (Medicenters of America)	X			X	X	X	X	X	X
Mid America Nursing Centers		X				X	X	X	X
Monterey Life Systems (MLS)	X								
Northern Virginia Doctors Hospital (NVDH)		X		X	X	X	X	X	X
National Health Enterprises	X			X	X	X	X	X	X
National Health Services	X					X	X		
National Living Centers	X								

TABLE C-2

SUMMARY OF DATA AVAILABILITY FOR 61 PUBLICLY HELD NURSING HOME CORPORATIONS, 1970-76

(Continued)

Firms Identified as Primarily Nursing Home Operations	Stock Price Availability			SEC Form 10-K Availability					
	Weekly	Monthly	Unusable or Not Found	70	71	72	73	74	75
Nationwide Nursing Centers		X		X	X	X	X		
Nodaway Valley Packing		X		X	X	X	X	X	X
Nursecare Health Centers			X					X	X
Pacer Phoenix	X							X	X
Professional Care Services		X		X	X	X	X	X	X
Provincial House	X			X	X	X	X	X	X
Rembrandt Enterprises	X					X	X	X	X
Retirement Living		X		X	X	X	X	X	X
Sossin System		X		X	X	X	X	X	X
Sunnycrest Nursing Facilities			X			X	X		
Sunshine-Fifty			X	X	X	X	X	X	X
Townco Medical Enterprises		X				X	X	X	X
Unicare Services		X		X	X	X	X	X	X
Varicare		X		X	X	X	X	X	X
Wyndon	X					X	X	X	X
Totals 61	29	20	12						56

TABLE C-3

RAW FINANCIAL DATA FROM 10-K FORMS FOR 56 PUBLICLY TRADED NURSING HOME FIRMS, 1970-75

Variable[a]	Item	Card: Card Column(s)
	Card Number (1...4)	1:3
	SEC File Number (1...56)	1:4-5
	Year (0...5)	1:6
VAR 002	Cash	1:7-15
VAR 003	Inventories	1:16-25
VAR 004	Current Assets	1:26-35
VAR 005	Land (also included in VAR 006)	1:36-45
VAR 006	Fixed Assets, net of accumulated depreciation	1:46-55
VAR 007	Accumulated Depreciation	1:56-65
VAR 008	Total Assets	2:7-15
VAR 009	Current Liabilities	2:16-25
VAR 010	Long-Term Liabilities	2:26-35
VAR 011	Deferred Tax Credit (Liability)	2:36-45
VAR 012	Preferred Stock, Total Book value (par value + contributed capital in excess of par value)	2:46-55
VAR 013	Common Stock, par value	2:56-65
VAR 014	Common Stock, contributed capital in excess of par	3:7-15
VAR 015	Retained Earnings	3:16-25
VAR 016	Total Revenue	3:26-35
VAR 017	Total Operating Expenses, not including taxes	3:36-45
VAR 018	Depreciation and Amortization Expense	3:46-55
VAR 019	Interest Expense	3:56-65
VAR 020	Rental/Lease Expense	4:7-15
VAR 021	Income Taxes	4:16-25
VAR 022	Net Earnings	4:26-35
VAR 023	Dividends Declared on Common Stock	4:36-45
VAR 024	Current Period Deferred Income Taxes	4:46-55
VAR 025	Month and Date of Reporting Period	4:56-65

[a] All variables are reported as of the end of reporting period.

TABLE C-4

MEANS AND STANDARD DEVIATIONS OF THE RAW FINANCIAL DATA FROM SEC 10-K FORMS FOR 56 PUBLICLY TRADED NURSING HOME FIRMS 1970-1975

Variable	Mean	Standard Deviation
Cash	$ 848,943	$ 1,558,620
Inventories	1,262,256	5,190,599
Current Assets	4,904,887	10,220,000
Land	1,186,116	1,610,222
Fixed Assets	9,830,744	11,700,000
Accumulated Depreciation	1,795,339	2,305,835
Total Assets	42,290,000	395,300,000
Current Liabilities	3,340,808	5,566,318
Long-Term Liabilities	8,241,088	10,080,000
Deferred Tax Credit	220,722	410,759
Preferred Stock[a]	660,420	1,189,958
Common Stock (par value)	583,301	1,042,516
Common Stock (capital contributed in excess of par)	4,633,648	8,565,900
Retained Earnings	279,322	2,712,057
Total Revenue	13,610,000	23,160,000
Total Expenses (less taxes)	13,010,000	22,570,000
Depreciation and Amortization	449,767	548,100
Interest Expense	660,876	831,691
Rental/Lease Expense	42,180,000	646,800,000
Income Taxes	264,994	392,987
Net Earnings	186,434	1,001,951
Dividends Declared on Common Stock	14,262	53,352
Current Period Deferred Income Taxes	61,170	186,345

[a] Excludes firms with no preferred stock.

All of the following were examined as possible sources of stock prices for the 61 firms in the study group:

1. National News Service, Inc. Bank and Quotation Record, New York, New York, [9].
2. National News Service, Inc. Commercial and Financial Chronicle, New York, New York, [10].
3. Standard and Poor's Investment Statistics Laboratory. Daily Stock Price Reports (both Over-the-Counter and American Stock Exchange reports), New York, New York, [14].
4. Review Publishing Company. Over-the-Counter Securities Review, Jenkintown, Pennsylvania, [13].
5. The Wall Street Journal, [2].
6. National Quotations Bureau. The Price Digest, New York, New York, [12].
7. National News Services. National Monthly Stock Summary, New York, New York, [11].

We were able to collect some price series data for 49 of the 61 firms. In each case, "bid" prices were recorded. Wherever possible, weekly price data for the firms in the sample were collected; such data were obtained for 29 firms. Where a weekly price series was not available, monthly price data were collected. Monthly data for 20 firms were obtained. This information is shown in Table C-2, columns 2 and 3. The monthly average quotation price and monthly rates of return are in Table C-5.

Some limitations exist in the stock price data. For the 49 firms for which price data were obtained, the series typically do not extend over the entire period 1971-76. Often the series began later than 1971, or terminated before 1976, or suffered from small "gaps" in the middle of the time period. Furthermore, the intersection of the set of firms for which stock price data were available and the set for which financial data from SEC 10-K forms were obtained, was 46 firms (Table C-2).

Finally, the estimation of a return on investment in a nursing home firm required dividend data as well as stock price data. Although most nursing home corporations do not pay regular dividends, 12 firms in the

TABLE C-5

AVERAGE MONTHLY QUOTATION PRICE AND MONTHLY RATE OF RETURN FOR 49 PUBLICLY HELD NURSING HOMES 1971-1976

Firm	% of Quotation with No Price Change	Price		Rate of Return	
		Average	Standard Deviation	Average	Standard Deviation
Alden Care Enterprises	.35	205	58	.008	.182
Alliance Medical Industries	.27	183	227	.024	.469
American Medical Affiliates	.23	263	96	.007	.164
American Medical Services	.25	216	98	.012	.162
Anta Corp.	.15	436	178	.023	.104
Berkeley Bio-Engineering	.07	1063	1291	-.016	.226
Beverly Enterprises	.16	433	383	-.002	.170
Care Corp.	.21	273	80	.016	.172
Care Inns (William Bond Inc.)	.44	404	180	0.016	.100
Carex International	.23	110	88	.041	.466
Community Health Facilities	.09	620	324	-.002	.055
Comprehensive Care	.04	354	142	.092	.187
Congeneric Corp.	.52	81	50	.016	.294
Continental Care Center	.16	482	93	.013	.119
Continued Care Facilities	.04	519	281	-.041	.210
General Care	.10	753	261	.038	.161
Geriatrics	.11	829	241	.027	.159
Geriatric & Medical Centers	.30	275	61	.003	.125
Gold Medallion	.31	220	158	-.011	.151
Golden State Health Centers	.42	89	54	.053	.389
Guardian	.25	489	259	.022	.250
Hillhaven	.09	548	155	.023	.229
Hy-Lond Engerprises	.21	94	35	.071	.450
King James Extended Care	.13	171	46	.045	.256
Leisure Lodges	.13	770	233	.027	.135
Lifestyle Companies	.06	290	132	.002	.200

TABLE C-5

AVERAGE MONTHLY QUOTATION PRICE AND MONTHLY RATE OF RETURN FOR 49 PUBLICLY HELD NURSING HOMES
1971-1976
(Continued)

Firm	% of Quotation with No Price Change	Price		Rate of Return	
		Average	Standard Deviation	Average	Standard Deviation
Manor Care	.18	436	201	.006	.058
Medic-Home Enterprises	.18	423	178	.005	.169
Medical Services	.17	323	155	-.007	.167
Medicalodges	.42	136	33	.011	.121
Merit Corp.	.16	495	459	.005	.202
Mid America Nursing Centers	.44	170	82	-.016	.135
Monterey Life Systems	.05	813	365	-.008	.187
Northern Virginia Doctors Hosp.	.14	594	175	-.019	.104
National Health Enterprises	.13	317	274	-.006	.222
National Health Services	.07	186	63	.038	.410
National Living Centers	.44	182	88	-.034	.182
Nationwide Nursing Centers	.14	57	50	.223	1.078
Nodaway Valley Packing	.52	30	22	.019	.232
Pacer Phenix	.33	202	98	-.005	.147
Professional Care Services	.19	103	69	.082	.592
Provincial House	.23	329	187	-.009	.131
Rembrandt Enterprises	.24	235	63	-.001	.171
Retirement Living	.41	336	106	.000	.160
Sossin System	.28	102	78	.082	.547
Townco Medical Enterprises	.33	250	123	-.010	.161
Unicare Services	.19	181	107	.017	.510
Varicare	.31	248	62	-.001	.156
Wyndon	.00	180	84	.016	.117

sample made a total of 20 dividend payments over the period 1971-76. These payments were located in the 10-K reports and in the annual issues of Moody's Dividend Record.

4. Market Rates of Return

Market rates of return were measured by price series data from the major stock exchanges, which were considered to represent "diversified portfolios." The price series data were collected on the following four indices for each day over the 1970-75 period:

- New York Stock Exchange Composite Average.
- National Association of Security Dealers' Over-the-Counter Index (NASDAQ-OTC)
- Standard and Poor's Composite Index.
- Dow-Jones Industrial Index.

The particular index that was used in the analysis in the text, Part IV, was determined as part of the empirical research. The source for the indices was the daily issues of The Wall Street Journal [2]. Table C-6 sets forth the values on the last trading day of each month, 1970-76, for each index.

5. Yield on Risk-Free Assets

The estimation of the risk measure β in the Capital Asset Pricing Model required the use of a riskless rate of interest. Locating and collecting a measure of this rate was another task in the Risk and Rate of Return Study.

As a proxy for the hypothetical risk-free asset, we selected 90-day U.S. Treasury Bills. The weekly and monthly yields on these Bills from the reported "ask discount" were computed. The exact methods for these computations are explained in the text.

The weekly ask-discount prices for 90-day Treasury Bills with seven days to maturity were collected for every week from January 1971 through December 1976. In addition, we collected monthly ask-discount prices for 90-day Treasury Bills with 30 days to maturity for every month for the same period. Unfortunately, no convenient summary of Treasury Bill prices

TABLE C-6

END-OF-MONTH VALUES OF FOUR STOCK MARKET INDICES, BY MONTH, 1971-76

Month and Year		Stock Market Index			
		Dow Jones	NYSE	NASDAQ	Standard & Poor's
1	71	86,850	5,264	39,893	10,512
2	71	87,883	5,319	42,149	10,637
3	71	90,437	5,544	43,800	11,042
4	71	94,175	5,727	47,113	11,498
5	71	90,781	5,492	10,825	11,016
6	71	89,114	5,509	10,780	10,995
7	71	85,843	5,281	10,527	10,527
8	71	89,302	5,474	10,842	10,940
9	71	88,719	5,433	10,903	10,877
10	71	83,900	5,207	10,510	10,385
11	71	83,134	5,184	10,397	10,377
12	71	83,057	5,643	11,412	11,272
1	72	90,217	5,771	11,887	11,501
2	72	92,813	5,924	12,538	11,847
3	72	94,092	5,982	12,806	11,961
4	72	95,417	6,000	13,133	12,013
5	72	96,072	6,076	13,253	12,249
6	72	92,903	5,931	13,008	11,991
7	72	92,474	5,909	12,315	12,077
8	72	96,372	6,111	12,995	12,428
9	72	95,327	6,060	12,961	12,374
10	72	95,552	6,112	13,024	12,452
11	72	101,821	6,388	13,296	12,995
12	72	102,002	6,448	13,373	13,187

TABLE C-6

END-OF-MONTH VALUES OF FOUR STOCK MARKET INDICES, BY MONTH, 1971-76

(Continued)

Month and Year		Stock Market Index			
		Dow Jones	NYSE	NASDAQ	Standard & Poor's
1	73	99,902	6,275	12,840	13,000
2	73	94,792	5,961	11,980	12,415
3	73	95,101	5,985	11,746	12,500
4	73	92,143	5,673	10,785	11,970
5	73	90,141	5,542	10,264	11,735
6	73	89,171	5,484	10,098	11,672
7	73	92,640	5,765	10,864	12,169
8	73	88,757	5,564	10,487	11,721
9	73	97,410	5,851	11,120	10,843
10	73	95,658	5,828	11,017	10,829
11	73	82,225	5,118	9,351	9,592
12	73	85,016	5,182	9,219	9,735
1	74	85,554	5,164	9,493	9,657
2	74	86,053	5,156	9,435	9,622
3	74	84,668	5,021	9,227	9,398
4	74	83,675	4,793	8,686	9,031
5	74	80,217	4,592	8,020	8,728
6	74	80,241	4,490	7,596	8,600
7	74	75,743	4,155	6,999	7,931
8	74	67,858	3,770	6,237	7,215
9	74	60,787	3,345	5,567	6,354
10	74	66,552	3,897	6,523	7,390
11	74	61,866	3,713	6,295	6,992
12	74	61,624	3,613	5,982	6,856

TABLE C-6

END-OF-MONTH VALUES OF FOUR STOCK MARKET INDICES, BY MONTH, 1971-76

(Continued)

Month and Year	Stock Market Index			
	Dow Jones	NYSE	NASDAQ	Standard & Poor's
1 75	70,369	4,091	6,978	7,698
2 75	73,905	4,307	7,300	8,159
3 75	76,815	4,421	7,566	8,336
4 75	82,134	4,619	7,854	8,730
5 75	83,229	4,846	8,310	9,115
6 75	87,899	5,085	8,702	9,519
7 75	83,151	4,752	8,319	8,875
8 75	83,534	4,629	7,901	8,688
9 75	79,388	4,449	7,433	8,387
10 75	83,604	4,705	7,699	8,904
11 75	86,067	4,824	7,880	9,124
12 75	85,241	4,764	7,762	9,019
1 76	97,525	5,355	8,705	10,086
2 76	97,261	5,335	9,026	9,971
3 76	99,945	5,480	9,062	10,277
4 76	99,685	5,411	9,008	10,164
5 76	97,523	5,331	8,804	10,018
6 76	100,278	5,571	9,032	10,428
7 76	98,464	5,526	9,129	10,344
8 76	97,374	5,492	8,970	10,291
9 76	99,019	5,623	9,126	10,524
10 76	96,493	5,489	9,035	10,290
11 76	94,722	5,480	9,112	10,210
12 76	99,909	5,756	9,705	10,688

exists. Thus, ask-discount prices were collected one at a time from microfiched issues of The Wall Street Journal for the six-year period. The computed monthly rates of return are shown in Table C-7.

6. Financial Data for Privately Held Nursing Homes

The final set of data collected was the detailed financial information for a sample of privately held nursing homes. These financial data are used in the equation predicting the relationship of the financial information to the risk measure, β.

All data necessary to construct the financial measures that were examined in the process of analyzing risk were collected for each firm in the sample from the four states. These correspond to these data discussed above that were collected from 10-K forms for publicly held corporations. The data were taken from the reports of nursing homes to the Medicaid program authorities in Colorado, Georgia, New York, and Washington. Reporting practices differed both across states and over time within each state. Consequently, the precise set of variables collected in order to construct the variables of interest differs slightly in each state and for each year.

The data for construction of these financial variables were collected simultaneously with the data for the state rate-of-return calculations, discussed in Appendix B. The coding sheets for the data are a part of that Appendix. The means and standard deviations for these variables are found in Table B-8.

7. Summary of Data Location and Collection

In summary, locating and collecting the data required for the Risk and Rate of Return Study of this project was a long and difficult process. Large amounts of microdata were collected from many different sources. An even larger number of potential data sources were carefully examined. Almost none of the data were available in organized secondary sources, so many hours were spent reading microfilm, checking and re-checking data, tracking down and verifying the existence and character of nursing home corporations, examining 10-K forms, telephoning firms for information, and

TABLE C-7

MONTHLY RATES OF RETURN ON 90-DAY TREASURY BILLS 1971-76[a]

Month	Year					
	1971	1972	1973	1974	1975	1976
Jan	.00356	.00261	.00406	.00599	.00518	.00421
Feb	.00294	.00214	.00408	.00567	.00394	.00329
Mar	.00262	.00248	.00450	.00572	.00355	.00381
Apr	.00260	.00276	.00460	.00686	.00420	.00384
May	.00298	.00258	.00495	.00707	.00403	.00385
June	.00305	.00267	.00508	.00623	.00385	.00401
July	.00364	.00291	.00575	.00623	.00460	.00440
Aug	.00413	.00295	.00686	.00616	.00492	.00424
Sept	.00355	.00332	.00696	.00746	.00505	.00383
Oct	.00373	.00362	.00611	.00501	.00515	.00423
Nov	.00312	.00367	.00545	.00508	.00423	.00375
Dec	.00314	.00402	.00618	.00586	.00382	.00363

[a] Computed on Bills with 30 days to maturity on the last trading day of each month.

editing the state nursing home cost and financial reports. The data collected for this study, in brief, required extensive examination and editing to ensure its comparability across firms and years and its suitability for the analyses.

B. The Accounting-Risk Measures

Once β coefficients were obtained for the publicly held corporations, the financial ratios and variables were used to explain the variations in β values among these firms. The financial ratios for the publicly held corporations are defined and constructed in Table C-8. The means and standard deviations for the relevant variables for the 37 firms are also found in that table.

Financial ratios and variables were similarly defined for the privately held firms in the various states. These appear in Table C-9. The mean and standard deviation of these variables used to estimate the β coefficients for the facilities in the four states appear in Table C-10.

TABLE C-8

CONSTRUCTION, MEANS AND STANDARD DEVIATIONS OF FINANCIAL RATIOS AND THE MEAN BETA VALUE FOR 37 PUBLICLY HELD FIRMS 1971-1976

Financial Ratio	Construction[a]	Mean (Standard Deviation)
I. Liquidity Measures		
1. Current Assets/Current Liabilities	VAR004/VAR009	1.267 (.644)
2. Cash/Current Liabilities	VAR002/VAR009	.309 (.281)
3. Cash/Total Assets	VAR002/VAR008	.063 (.052)
II. Leverage Measures		
1. Long-term Liabilities/Total Assets	VAR010/VAR008	.504 (.174)
2. Total Liabilities/Total Assets	(VAR009+VAR010)/VAR008	.699 (.231)
3. Interest Expense/Total Revenue	VAR019/VAR016	.309 (.281)
III. Size Measures		
1. Average Value of Total Assets[b]	$\sum_{i=1}^{N} \text{VAR008}_i/N$	16.366 (1.075)
2. Average Logarithmic Value of Total Assets[b]	$\sum_{i=1}^{N} \ln(\text{VAR008})_i/N$	22425300 (30562500)

TABLE C-8

CONSTRUCTION, MEANS AND STANDARD DEVIATIONS OF FINANCIAL RATIOS AND THE MEAN BETA VALUE FOR 37 PUBLICLY HELD FIRMS

1971-1976
(Continued)

Financial Ratio	Construction[a]	Mean (Standard Deviation)
IV. Growth Measures		
1. Average Logarithmic Value of the Ratio of Total Assets at the End of the Period to Total Assets at the Beginning of the Period[c]	$\ln\left[\frac{VAR008_E}{VAR008_B}\right] / (E-B)$	16.460 (1.242)
2. Average Annual Change in Net Earnings[c]	$(VAR022_E - VAR022_B)/(E-B)$	109669 (377321)
3. Average Ratio of Net Earnings in Year t to Net Earnings in Year t-1[d]	$\sum_{t=2}^{N} \frac{VAR022_t}{VAR022_{t-1}} / N-1$	-4.209 (29.383)
V. Earnings Variability Measure		
1. Coefficient of Variation of Net Earnings	$\frac{\text{Standard Deviation of } VAR022}{\text{Mean } VAR022}$	2.859 (6.616)
VI. Income Ratios		
1. Net Earnings/Total Assets	VAR022/VAR008	.046 (.043)
2. Net Earnings/Equity	$\frac{VAR022}{VAR013+VAR014+VAR015}$	.080 (.117)
3. Adjusted Net Earnings/Adjusted Total Assets	$\frac{VAR022+VAR018+VAR019}{VAR008+VAR009}$	.066 (.041)

TABLE C-8

CONSTRUCTION, MEANS AND STANDARD DEVIATIONS OF FINANCIAL RATIOS AND THE MEAN BETA VALUE FOR 37 PUBLICLY HELD FIRMS

1971-1976
(Continued)

Financial Ratio	Construction[a]	Mean (Standard Deviation)
4. Net Earnings/Total Revenue (Profit Margin)	VAR022/VAR016	.013 (.066)
VII. Capital Turnover Ratios		
1. Total Revenue/Fixed Assets	VAR016/VAR006	7.683 (4.492)
2. Total Revenue/Total Assets	VAR016/VAR008	.0000214 (.0000640)
BETA VALUE (β)	Estimated, see Table IV-2	.810 (.678)

[a] Variable codes are defined in Table C-3.

[b] N is the number of reports received from each firm.

[c] E is the year ending the growth period; B is the year beginning the growth period.

[d] In states with two reports per year, the computation is performed in terms of the ratio of semiannual period t to semiannual period t-1.

TABLE C-9

CONSTRUCTION OF FINANCIAL RATIOS FOR THE STATE STUDY SAMPLE

Financial Ratio	Construction[a]
I. Leverage Measure	
Interest Expense/Total Revenue	VAR019/VAR020
II. Growth Measure	
Average Annual Change in Net Earnings[b]	$(VAR014_E - VAR014_B)/(E-B)$
III. Earnings Variability Measure	
Coefficient of Variation of Net Earnings	$\frac{\text{Standard Deviation of VAR014}}{\text{Mean VAR014}}$
IV. Income Ratio	
Net Earnings/Total Revenue (Profit Margin)	VAR014/VAR020

[a] The variable codes are those of the "intermediate variables" defined in Table B-6.

[b] E is the year ending the growth period; B is the year beginning the growth period.

TABLE C-10

MEANS AND STANDARD DEVIATIONS OF ACCOUNTING VARIABLES USED TO ESTIMATE THE BETA (β) COEFFICIENT OF FACILITIES IN FOUR STATES 1971-1975

State	Number of Facilities	Leverage Measure	Growth Measure	Variability Measure	Income Ratio
		Interest to Total Revenue Ratio	Average Annual Change in Net Earnings	Coefficient of Variation of Net Earnings	Profit Margin
Colorado	146	.048 (.044)	7594 (50676)	3.432 (6.481)	.028 (.082)
Georgia	169	.046 (.046)	11480 (32977)	2.520 (6.597)	.019 (.057)
New York	131	.017 (.032)	7925 (59489)	3.225 (12.495)	.023 (.048)
Washington	220	.030 (.032)	2876 (22295)	3.117 (7.641)	.019 (.069)

TABLE C-11

MEANS AND STANDARD DEVIATIONS OF VARIABLES USED TO ESTIMATE THE β COEFFICIENT OF FACILITIES IN FOUR STATES

State	N	TL/TA	π/GR	I/TR	Earnings Growth	Earnings Var.	EG/TR	EG/TA
Colorado	146	.820	.028	.048	7594	3.432	.016	.050
		(.292)	(.082)	(.044)	(50676)	(6.481)	(.116)	(.346)
Georgia	169	.748	.019	.046	11480	2.520	.027	.051
		(.315)	(.057)	(.046)	(32977)	(6.597)	(.076)	(.218)
New York	131	.964	.023	.017	7925	3.225	.007	.017
		(.596)	(.048)	(.032)	(59489)	(12.495)	(.042)	(.208)
Washington	220	.746	.019	.030	2876	3.117	.000	.002
		(.293)	(.069)	(.032)	(22295)	(7.641)	(.054)	(.138)

Definitions:

TL/TA = Total Liabilities/Total Assets
π/GR = Net Income/Gross Revenue = (profit margin)
I/TR = Interest/Total Revenue
Earnings Growth (EG) = Annual Change in Net Income
Earnings Variability = Standard Deviation of Net Income/Mean of Net Income
EG/TR = Earnings Growth/Total Revenue
EG/TA = Earnings Growth/Total Assets

Sample: Nonprofit firms deleted, outlier r of r firms deleted, and firms with only one year of data deleted.

C. References for Risk and Rate of Return Study Data

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APPENDIX D:

VERTICAL AND HORIZONTAL INTEGRATION THEORIES AND STUDY DATA

VERTICAL AND HORIZONTAL INTEGRATION THEORIES AND STUDY DATA

A. Hypotheses on Profitability and Integration

There are two sets of hypotheses in the economics literature concerning profitability and integration. The first discusses the issues of horizontal and vertical integration as efforts by firms to achieve market power. The second incorporates the concept of vertical and horizontal integration in the discussion of the efficient size of the firm.

1. Market Power

The major thrust of the studies on market power was centered around the hypothesis that the greater the extent of horizontal and and vertical integration within a firm, the more influence the firm can exert in the market. This influence, it was argued, can lead to noncompetitve behavior which manifests itself in higher rates of return. Horizontal integration in such studies was commonly seen as an attempt to capture a larger share of the market. Most studies on the subject have attempted to estimate whether profitability was related to horizontal integration.[5] Horizontal integration in this literature was commonly measured as a four, eight, or twenty firm concentration ratio [4, 5, 9, 17, 20].[6] Variants of the concentration ratio such as the Gini coefficient or the Herfindahl index, were also used as measures of horizontal integration [10, 11, 18.].

The usefulness of these measures for purposes of our study was limited. The nursing home industry is characterized by thousands of small firms, most of which operate a single facility and a few, several facilities. There are no firms which have any substantial share of the national or a state market.[7] There is a trend in the nursing home industry toward expansion of multifacility firms. The available literature, however, does not provide any measures of horizontal integration that were directly relevant to the question of high profitability among multifacility nursing home firms.

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[5] A review of such studies is contained in an article "The Concentration-Profits Relationship and Antitrust" by Leonard Weiss

[6] References are contained in the list at the end of this Appendix.

[7] It is possible that in some states a large multifacility firm may control five percent to ten percent of all facilities.

The literature on vertical integration and market power also examined firms' attempts to internalize certain cost of production and transactions, mainly by gaining control over the production of inputs and the distribution of services produced. Perhaps, the most comprehensive treatment on the measure of vertical integration was provided by Adelman [2]. Measures most commonly used in the literature were ratios of income or inventory or value added to sales or a similar revenue base [1, 2]. The rationale behind these measures was that the higher the ratio, the more costs of production were being internalized. These measures were quite useful for the purposes of this study. The specific variants of the measures used in this study are described in the text.

2. Size of Firm

The second theme in the industrial organization literature attempted to explain industrial structure by applying marginal principles to the question of the function of a firm. A number of studies have attempted to identify the factors that influence the size of the firm [31, 6, 12, 22]. The major factors that have been argued to determine the size of a firm were technology, efficient management size, market size, and the legal and social constraints under which the firm operated.[8]

The above factors were important for developing a theoretical basis for why a trend towards an expansion of multifacility firms in the nursing home industry has been observed over the last decade or so. Although an explicit theory of firm structure was beyond the scope of this project, nevertheless, elements of such a theory are implicit in our empirical work. A brief discussion of the nature of the nursing care market and its likely influence on the size of nursing home operations was included in the text.

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[8] Unfortunately, there has been little empirical work of significance on this subject.

3. Measurement of Profitability

The measurement of profitability was central to the literature on industrial organization and to this study. The economic literature on the empirical analysis of the measurement of profitability also showed two types of measures that have been most commonly used. The first set of measures tried to capture the deviation of the existing market structure from the structure expected under competition [5, 9, 11, 18]. These measures were based on the differences between the market price and competitive price, and were used as proxies for market power of the firms. Prominent among these measures was the Lerner Index, (P-MC)/MC, which has been extensively used [7, 8, 14, 15, 16]. The second set of measures of profitability were rate of return proxies, such as the ratio of profits to assets, equity, sales, or expenditures. Several variants of these can be found in the literature [7, 13, 17, 19]. Issues related to these measures include whether taxes, or interest, or depreciation, or all of these should be considered when deriving the value for profits.

The latter set of measures of profitability were directly applicable to our efforts in this study, and those used are explained in the text. The set of measures on profitability and market power were not relevant to the questions in this study because the market power hypothesis, as considered above, was not applicable to the nursing home industry.

B. Integration Study Data

The data source for the Integration Study consisted of 41 questionnaires from a 1976 survey of publicly held nursing home corporations. Each questionnaire contained data for two years of operation, 1974 and 1975.

Twelve of the questionnaires were not usable because of missing data, and one of the remaining 29 provided usable data for only 1974. Thus the data set consists of 28 firms for 1975 and the same 28 plus one for 1974, for a total of 57 observations.

From each questionnaire data on 16 variables were extracted. The means and standard deviations of the 16 variables are displayed in Table D-1.[9]

The 16 raw data variables were combined to define 15 final variables, as shown in Table D-2. The means and standard deviations of the final variables are contained in Table D-3.

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[9] The data supplied us through the questionnaires did not allow identification of the firms. Accordingly, we were unable to combine data from the 10K forms of the Securities and Exchange Commission and data in the questionnaire for each firm. The inability to do so severely restricted the scope of information on each firm, because the combined sources would have allowed more extensive analyses and greater consistency with the work in Part III.

TABLE D-1

MEANS AND STANDARD DEVIATIONS OF RAW DATA VARIABLES FROM QUESTIONNAIRES TO MULTIFACILITY NURSING HOME FIRMS, 1974-75

Variable	Definition	Mean	Standard Deviation
VAR001	Gross Revenue from Nursing Home Operations	$15,530,000	$15,710,000
VAR002	Gross Revenue from Managed Facilities	$ 19,049	$ 67,508
VAR003	Gross Revenue from Leased-Out Facilities	$ 65,159	$ 185,240
VAR004	Gross Revenue from Nursing Home Related Activities	$ 7,932,903	$18,590,000
VAR007	Net Income from Nursing Home Operations	$ 467,281	$ 744,320
VAR008	Net Income from Managed Facilities	$ 6,651	$ 27,126
VAR009	Net Income from Leased-Out Facilities	$ 228	$ 37,438
VAR017	Nursing Home Assets Owned or Operated	$20,890,000	$19,630,000
VAR018	Nursing Home Assets Leased to the Firm	$ 2,680,700	$ 7,257,483
VAR020	Net Worth (Owner's Equity)	$17,480,000	$50,580,000
VAR022	Facilities Owned and Operated	16.04	13.37
VAR023	Facilities Leased	7.21	15.06
VAR024	Facilities Managed	.60	1.75

TABLE D-1

MEANS AND STANDARD DEVIATIONS OF RAW DATA VARIABLES FROM QUESTIONNAIRES TO MULTIFACILITY NURSING HOME FIRMS, 1974-75

(Continued)

Variable	Definition	Mean	Standard Deviation
VAR025	Facilities Leased Out	.60	1.25
VAR026	Beds Operated	1,623	1,158
VAR027	Beds Leased	844	1,764
VAR028	Beds Managed	70	229
VAR029	Beds Leased Out	76	154
VAR030	Private Bed Days	267,492	270,437
VAR033	Total Bed Days	836,013	879,231

TABLE D-2

CONSTRUCTION OF FINAL VARIABLES FOR INTEGRATION STUDY ANALYSES

Final Variable	Symbol	Construction from Raw Data (Table D-1)
Rate of Return	ROFR	(VAR007 + VAR008 + VAR009)/VAR017
Proportion of Revenue from Nursing Home Related Activities	V1	VAR004/(VAR001 + VAR002 + VAR003 + VAR004)
Revenue from Nursing Home Related Activities	V2	VAR004
Owned and Operated Beds	H1	VAR026
All Operated Beds	H2	VAR026 + VAR027 + VAR028
All Beds	H3	VAR026 + VAR027 + VAR028 + VAR029
Owned and Operated Facilities	H4	VAR022
All Operated Facilities	H5	VAR022 + VAR023 + VAR024
All Facilities	H6	VAR022 + VAR023 + VAR024 + VAR025
Owner's Equity	E	VAR020
Geographic Dispersion	GED[a]	---
Assets	A	VAR017
Beds per Facility	BEDS/F	(VAR026 + VAR027 + VAR028)/ (VAR022 + VAR023 + VAR024)
Private Patient Days/Total Patient Days	PRIV/TOT	VAR030/VAR033

[a] See formula in text.

TABLE D-3

MEANS AND STANDARD DEVIATIONS OF FINAL VARIABLES FOR INTEGRATION STUDY ANALYSES AMONG 29 MULTIFACILITY NURSING HOMES, 1974-75

Final Variable	Symbol	Mean	Standard Deviation
Rate of Return	ROFR	.023	.020
Proportion of Revenue from Nursing Home Related Activities	V1	.184	.283
Revenue from Nursing Home Related Activities	V2	$ 7,932,900	$18,591,800
Owned and Operated Beds	H1	1622.61	1157.91
All Operated Beds	H2	2536.14	2465.88
All Beds	H3	2611.96	2532.62
Owned and Operated Facilities	H4	16.035	13.370
All Operated Facilities	H5	23.842	27.953
All Facilities	H6	24.474	28.437
Owner's Equity	E	$17,487,400	$50,583,800
Geographic Dispersion	GED	.618	.294
Assets	A	$20,898,300	$19,633,700
Beds per Facility	BEDS/F	116.209	29.071
Private Patient Days/Total Patient Days	PRIV/TOT	.185	.429

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APPENDIX E:

SUPPLEMENTARY TABLES AND RESULTS

SUPPLEMENTARY TABLES AND RESULTS

A. Introduction

Appendix E contains supplementary tables and results obtained using alternative dependent variables or regression analyses made on different subsets of the data. The descriptive tables contain data not elsewhere reported. Only in the case of the National Study were there alternative dependent variables used in the analysis. However, in several cases, regressions or computations were based on different sample sizes, such as proprietary facilities versus all facilities, or on equity capital versus total asset bases.

Section B of the Appendix contains a brief description of analysis performed but not reported in Part II, on the National Study of Reimbursement Policies and the Growth of the Nursing Home Industry. Sections C and D contain supplemental tables on other Parts of the report.

B. National Study Supplemental Tables and Results

This section is divided into two subsections. Subsection 1 below describes and discusses our first two attempts to specify reimbursement systems in a fashion suitable for regression analysis. For reasons discussed below, both were found inferior to the specification we eventually adopted and presented in Part II. Subsection 2 reports the results of nine sets of regression equations which estimated the relationship between features of reimbursement systems and characteristics of the nursing home industry.

1. Alternative Specifications of Reimbursement Systems

A major problem in the National Study was to convert the qualitative description of reimbursement systems into quantitative variables amenable to use in statistical investigation. The most obvious solution to this problem was to list all of the possible elements of reimbursement systems and then describe any particular system by means of dummy variables which take the value one if a given feature is present. However, given the number of possible reimbursement features and only 48 states, such a procedure would consume excessive degrees of freedom.

The first attempt to solve this problem was to reduce the number of variables required to describe reimbursement systems by means of Principal Component Analysis. However, this technique was unsuccessful. We next tried to determine on an a priori basis which elements should have dominant effects on profits, and to characterize reimbursement systems by this limited set of variables. This "Major Elements" approach was also unsuccessful; however, by bringing certain problems to center stage it led to the approach which was ultimately adopted.

Principal Components Analysis

Principal components analysis is a specialized procedure in factor analysis.[10] Given a set of n variables, the principal components procedure creates n orthogonal components, or factors, each a linear combination of the original variables but with the property that the first component is that vector of numbers which maximizes the proportion of explained variance in the original data set. (The variance of the data set is simply the sum of the variances of each variable after the variables have been standardized.) Similarly, the second component maximizes the proportion of explained variance after the effects of the first component have been accounted for, and so on.

Given that the components are linear combinations of the n original variables, n components will always account for 100 percent of the variation in the original data. It may be, however, that only a few components can account for almost all of the variation in the original data. In this case, these few components can be substituted in a regression equation for all n original variables with only minimal information loss, although the interpretation of the coefficients becomes less clear. The rules for determining how many components to include in lieu of the original variables are fairly subjective. We included a component if its associated eigenvalue was greater than or equal to one, though we also experimented with fewer components.

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[10] See Norman H. Nie, et al., [37 , pp. 468-514], and Richard L. Gorsuch, [38] for more detailed descriptions of this procedure.

Each component is a linear combination of the original variables, i.e.,

$$\text{E-(1)} \quad P_i = \sum_j b_{ij} V_j \qquad i, j = 1,..n$$

where

P_i is the i^{th} component,
V_j is the j^{th} variable, and
b_{ij} is called the component or factor score.

The factor scores for the first six principal components of our reimbursement variables data set are displayed in Table E-1. We had hoped that related reimbursement variables would "load" (have high factor scores) on the same factor. If this had been the case, one could have determined which general areas of reimbursement policy (e.g., method for paying for capital) were important in explaining profitability. Unfortunately, as Table E-1 indicates, most of the factors did not yield meaningful groupings. This outcome resulted from the relatively low correlation among the raw reimbursement policy elements. The approach was accordingly abandoned.

"Major Elements" Model

When the principal components technique did not succeed in describing reimbursement systems, we tried to identify the important elements on an *a priori* basis. These elements were determined on the basis of a careful review of the existing reimbursement literature and discussions with representatives of the four state Medicaid agencies assisting in the state studies. Once obtained, these elements, together with the control variables, were entered into an ordinary least squares regression equation of the form E-(2):

$$\text{E-(2)} \quad Y = a_o + \sum_i^k b_i X_i + \sum_i^L c_i Z_j + \varepsilon$$

where the change in bed capacity (Y) is a linear function of the major reimbursement policy elements (X_i's), the control variables (Z_j's), and a random disturbance term (ε). The a's, b's, and c's are the parameters to be estimated.

The major elements approach was also unsuccessful, not because there was disagreement over what constituted a major element, but because the regression coefficients from equation E-(2) could not be interpreted in a

TABLE E-1

REIMBURSEMENT POLICY ELEMENTS AND PRINCIPAL COMPONENT FACTOR SCORES FOR THE FIRST SIX FACTORS[a]

Reimbursement Policy Elements from Table A-5	Principal Components					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Negotiated	-.68707*	-.14005	-.07274	.17852	-.09435	.12862
Prospective	-.72423*	.09747	-.01355	-.22444	.21898	-.12374
Group Rate	-.78518*	-.21106	.00144	-.16613	-.15145	-.06470
Patient Mix	-.54067*	-.14515	-.13682	.12455	.02412	.20403
Medicare Criteria	.50763*	-.33540*	-.28652	-.25269	-.15090	.42572*
Return on Equity	.56452*	.09279	.10510	-.54153*	.06830	.50085*
Flat Profit Rate	.10516	.10448	.09392	.89002*	-.14791	.08038
Percent of Costs	.15656	.06560	-.17393	-.01961	-.08207	-.86390*
Depreciation as Allowable Cost	.86353*	.17153	-.03109	.20720	.20494	.07965
Original Cost Depreciation Base	.19016	-.47482*	.32396*	-.02511	.58103*	-.03486
Straight-Line-Only Depreciation	.25631	.44299*	.22179	.45317*	.24600	-.25442
Property Cost Limit	.08195	.04885	.87926*	-.03053	-.13739	.07099
Total Payment Limit	.45504*	.13189	-.34897*	.26065	-.01344	.40178*
Operating Cost Limit	.07995	-.00377	.76867*	.18740	.27886	.06219
Administrative Salary Limit	.20955	.71974*	.03165	.25303	.01225	-.04527
Interest Limit	-.00657	.23206	.01714	-.10256	.82745*	.04772
Arms Length Regulation	.16436	.56147*	-.13535	-.03074	.42380*	.18346
Occupancy Rate Regulation	.16155	.81940*	.03183	-.01451	.12225	-.13657
Cost Reports Collected	.89896*	.25998	.08054	.04992	.08763	-.05406
Audit	.48510*	.53402*	.10524	-.10713	-.18176	.09838

[a] Variable with an absolute factor score greater than or equal to .30000 is marked with an asterisk.

meaningful way. This was because the excluded category for various dummy variables was unclear. For example, consider Table E-2 where the reimbursement variables are grouped by level of specificity--from general characteristics of the reimbursement policy on the left, down to very specific provisions on the right. Suppose that whether or not accelerated depreciation were allowed had been identified as an important element of reimbursement policy. The coefficient of this variable would measure the average difference in growth rates between states with accelerated depreciation provisions versus states without, including both states with mandatory straight-line depreciation and states with flat-rate reimbursement systems and no depreciation policy specified. Such a comparison was of little value. What we were interested in was a comparison of the growth rates only between states with accelerated and states with a straight-line policy.

The need to distinguish between states with a specified reimbursement provision and those that did not specify the provision led to the division of states between those with flat-rate reimbursement systems and those with cost-related payment systems. In the former, provisions were not specified because of the flat-rate characteristic. In the cost-related systems, some type of provision was generally indicated. Accordingly, the three equation model of Part II was adopted. Making direct comparisons at a general level across type of systems was accomplished through equation II-(1), and the examination of features of each system led to equations II-(2) and II-(3).

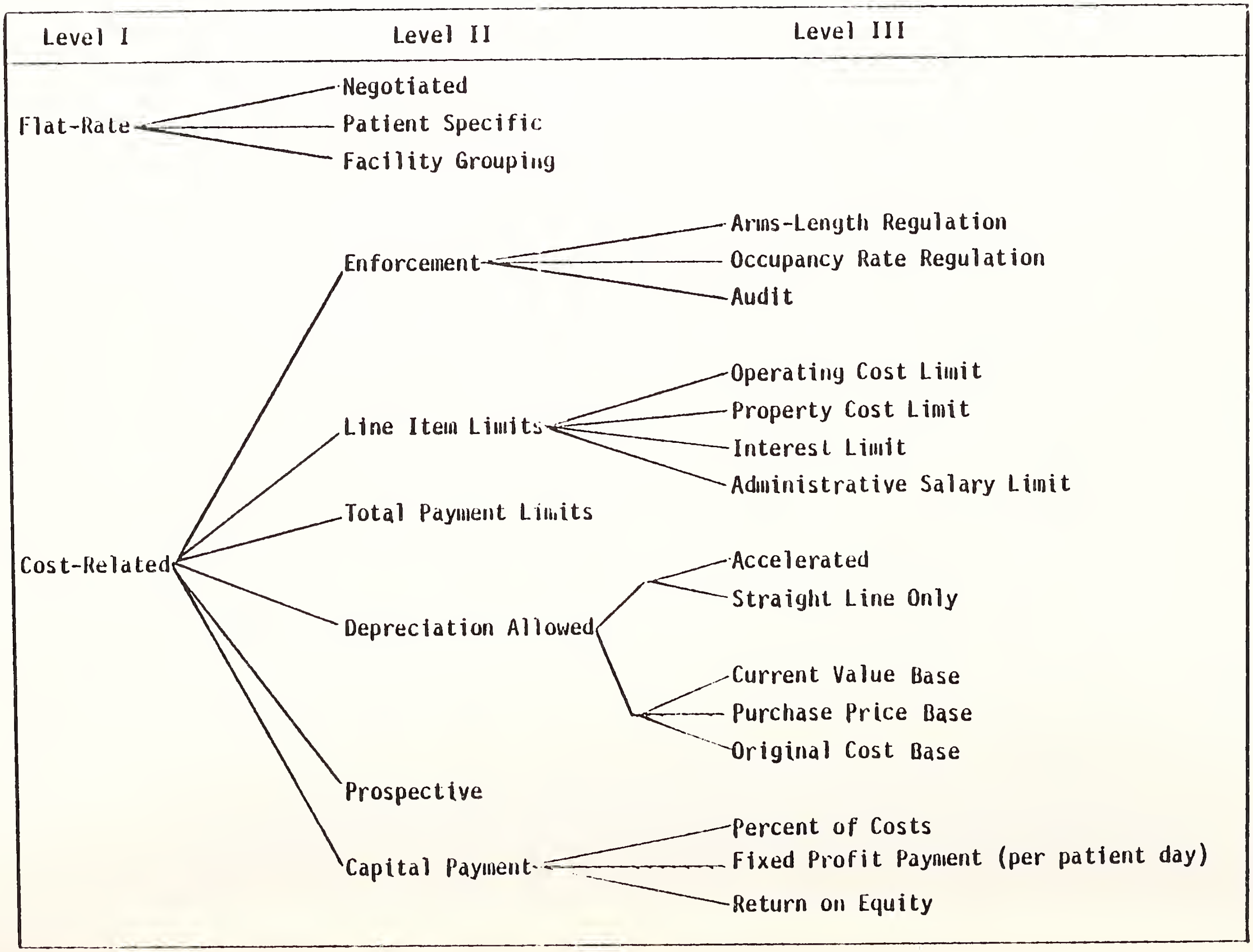
2. Results from Additional Regression Equations

Part B reports the results of nine sets of regression equations which explain various characteristics of the nursing home industry as a function of reimbursement variables and control variables. The model is identical to that reported in Part II; only the choice of dependent variable or the group of facilities being studied were different than that found in the text of Part II. Different combinations of independent variables were also used in some equations.

The first three tables, E-4, E-5, and E-6 present the results of the regression equations explaining the 1973 bed capacity and the 1969-73 change in bed capacity for proprietary facilities. These results are consistent

TABLE E-2

REIMBURSEMENT VARIABLES GROUPED BY LEVEL OF SPECIFICITY



with the corresponding results for all facilities reported in Part II and further support the conclusions reached in that chapter. Subsequent tables present the results of the regression analyses of bed certification, resident funding, quality of nursing services, and average facility size. In general these results are consistent with the hypothesis that alternative reimbursement policy elements did not have significant differential impacts on these facets of the long-term care industry. Further, while not an objective of this study, an analysis of the effects of the control variables in the various equations does shed light on the effects of changing socioeconomic factors on these dimensions of the industry. These effects are briefly highlighted.

The results of the regressions are discussed in sections designated by the dependent variable. Table E-3 is a list of dependent variables and tables that are associated with each dependent variable. Symbols of the explanatory variables are defined in Table E-37.

TABLE E-3

DEPENDENT VARIABLES IN TABLES E-4 THROUGH E-36

Dependent Variable	Table Number
Bed Capacity for Proprietary Facilities	E-4, E-5, E-6
Medicaid Certified Beds	E-7, E-8, E-9
Medicare Certified Beds	E-10, E-11, E-12
Change in Number of Medicare Beds, 1969-73	E-13, E-14, E-15
Source of Funding	E-16, E-17, E-18
(a) Quality of Nursing Services: Changes, 1969-73	E-19, E-20, E-21
(b) Quality of Nursing Services: Level, 1973	E-22, E-23, E-24
(a) Average Facility Size: Changes, 1969-73	E-25, E-26, E-27
(b) Average Facility Size: Level, 1973	E-28, E-29, E-30
Number of Facilities	E-31, E-32, E-33
Ratio of Proprietary Beds to Total Beds	E-34, E-35, E-36

- Bed Capacity for Proprietary Facilities

Table E-4 reports the results of equations explaining 1973 bed capacity and the 1969-73 change in bed capacity for proprietary facilities. These parameter estimates were generally consistent with but less significant than the results reported in the body of Part II. This was particularly so for the coefficients associated with the proportion of nonwhite elderly in the state (PCTNW) and the proportion of the elderly residing in mental hospitals (MRT). The effects of per capita elderly income (EINC), and personal care beds without nursing services (PCB and CHPCB) were virtually identical across ownership categories. Surprisingly, the average occupancy rate over the 1969-73 period (ORT) had no statistically significant effect on the change in bed capacity in the proprietary sector, but was strongly associated with growth for facilities as a whole. Notice too that the number of nonproprietary beds per thousand elderly (NPBD) was used as a measure of sources of substitute care in the proprietary capacity equation. It had the expected sign but was not significant at the 90 percent confidence level. Finally, the type of reimbursement coefficient (TRF) did not indicate any statistically significant difference in the change in bed capacity or the 1973 bed capacity for flat-rate versus cost-related Medicaid reimbursement systems.

Table E-5 reports the results of the regression equations on the residuals of the bed growth and bed capacity equations for cost-related reimbursement systems. The results were consistent with, but generally less statistically significant than the corresponding results for all facilities. The return on equity (ROE) and the occupancy rate regulation (ORR) variables in the capacity change equations, and the accelerated depreciation (ACCEL) and audit system (AUDIT) variables in the 1973 bed capacity equations differed across ownership classifications but in no case was the coefficient different from zero at a 90 percent confidence level. The results for flat-rate states reported in Table E-6 told a similar story. The only important difference across ownership categories was with respect to the level of the flat rate (FRA) in the change equation. The coefficient was larger and statistically significant in the proprietary sector, allowing one to predict more confidently an increase in per capita bed capacity with increased Medicaid per diem payments in the proprietary sector than in the industry as a whole.

TABLE E-4

RESULTS OF REGRESSION EQUATIONS FOR 1969-73 CHANGE IN BED CAPACITY AND FOR 1973 BED CAPACITY FOR PROPRIETARY FACILITIES, ALL STATES

Variable	Change in Bed Capacity 1969-73		Bed Capacity 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	2.897	.339	3.610	.406
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	5.444**	2.517	- .730	1.877
PCTNW	- .051	.043	- .895*	.463
EINC	- .366	.327	.014	.012
MRT	.117*	.065	- .073**	.025
ORT	.965	1.330	4.788**	2.102
TRF	.079	.107	.068	.124
PCB	.339**	.125	--	--
CHPCB	.062	.037	--	--
NPBD	--	--	- .005	.004
R^2	.282		.322	
RSS	3.888		5.259	
DF	40		41	
	The dependent variable was defined as the log of the change in the number of proprietary nursing care beds per 1000 elderly population from 1969 to 1973 plus 10. All independent variables were in logs with the exception of CHPCB and TRF.		The dependent variable was defined as the log of the number of proprietary nursing care beds per 1000 elderly in 1973.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-5

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN BED CAPACITY AND FOR 1973 BED CAPACITY FOR PROPRIETARY FACILITIES IN STATES WITH COST-RELATED SYSTEMS

Variable	Change in Bed Capacity, 1969-73		Bed Capacity, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.558	4.750	1.585	10.747
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	4.740	2.921	7.825	7.002
PRO	-1.749	2.166	2.924	5.191
ROE	-1.408	2.483	1.292	5.953
FPR	-3.525	3.510	-2.736	8.414
ACCEL	-3.492*	2.017	-4.795	4.835
TL	- .514	2.071	-2.988	4.964
AUDIT	- .930	2.455	-3.604	5.886
ORR	.502	2.193	-2.253	5.256
R^2	.200		.102	
RSS	559.673		3215.89	
DF	24		24	
	The dependent variable was defined as the estimated residual of the change in proprietary bed capacity equation shown in Table E-4.		The dependent variable was defined as the estimated residual of the 1973 proprietary bed capacity equation shown in Table E-4.	

*Significant at the 90% confidence level.

TABLE E-6

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN BED CAPACITY AND FOR 1973 BED CAPACITY FOR PROPRIETARY FACILITIES IN STATES WITH FLAT-RATE SYSTEMS

Variable	Change in Bed Capacity, 1969-73		Bed Capacity, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	1.116	7.204	2.633	16.284
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-30.380**	13.859	8.194	20.036
CSR	18.369**	4.246	13.629	13.361
GRT	2.996	3.019	11.300	10.403
FRA	12.452*	5.998	- .878	1.715
R^2	.616		.154	
RSS	299.214		3362.68	
DF	12		12	
	The dependent variable was defined as the estimated residual of the change in proprietary bed capacity equation shown in Table E-4 FRA was in logs.		The dependent variable was defined as the estimated residual of the 1973 proprietary bed capacity equation shown in Table E-4.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

- Medicaid Certified Beds

Tables E-7 through E-9 report the results of regression equations for the number of skilled Medicaid certified beds in 1973 by type of ownership. The "proprietary only" and "all facility" equations told the same story, although the coefficients were somewhat larger and more significant in the proprietary equations. Data on the dependent variables were obtained from the NCHS National Nursing Home Survey and subject to the efficiency test described in Appendix A. For this reason the number of observations was greatly reduced. It was not possible to estimate equations using change in bed certification as a dependent variable.

The results of the cross section reimbursement equations do confirm our expectations. The Medicaid skilled nursing expenditure per recipient (MDEX) was significantly associated with an increased ratio of Medicaid-SNF certified beds to total beds. Further, that ratio was significantly negatively associated with the Medicare nursing expenditures per recipient in the state (MREX). The percentage of nonwhite elderly (PCTNW) had the expected positive sign although it was statistically significant only in the case of proprietary facilities. If elderly nonwhite were poorer and had a higher incidence of illness as a group than whites, then states with larger nonwhite populations were likely to have more Medicaid-eligible citizens. One would, therefore, expect profit-maximizing firms to certify more beds for Medicaid patients.

The income variable (EINC) was positive and highly significant in both equations reported in Table E-7. The sign seems at odds with the Medicaid regulations relating to patient eligibility, since Medicaid is a program directed at the poor.

The dummy variable representing type of reimbursement system (TRF) was unable to capture any statistical difference, on average, between states with cost-related and those with flat-rate reimbursement systems. The Medicaid bed certification equations were thus consistent with the capacity equations in this important respect.

The equations reflecting reimbursement policy differences for cost-related and flat-rate states are presented as Tables E-8 and E-9 respectively. The results, while consistent across ownership equations, were uniformly insignificant in the statistical sense.

TABLE E-7

RESULTS OF REGRESSION EQUATIONS FOR THE NUMBER OF MEDICAID CERTIFIED BEDS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	- 1.170	.945	- 1.126	1.160
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-16.500*	8.149	-27.023**	10.190
PCTNW	.226	.155	.357*	.205
EINC	2.237**	1.027	3.926**	1.363
MREX	- 1.226*	.662	- 1.936**	.790
MDEX	.818**	.328	1.088**	.389
TRF	- .117	.283	- .243	.370
R^2	.517		.597	
RSS	12.942		13.550	
DF	25		20	
	Dependent variable was defined as the ratio of Medicaid-skilled certified beds to the number of nursing care beds for 1973 in logs. All independent variables, with the exception of TRF, were in logs.		Dependent variable was defined as the ratio of Medicaid-skilled certified beds to the number of nursing care beds in proprietary facilities for 1973 in logs. All independent variables, with the exception of TRF, were in logs.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-8

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE NUMBER OF MEDICAID CERTIFIED BEDS FOR STATES WITH COST-RELATED SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.021	.269	.465	.355
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.211	.225	-.039	.341
PRO	.023	.192	.225	.259
ROE	.259	.233	.443	.360
FPR	.350	.302	.454	.377
ACCEL	-.121	.184	-.394	.316
TL	-.322	.199	-.0004	.312
AUDIT	.349	.252	.115	.416
ORR	-.138	.245	.029	.301
R^2	.384		.400	
RSS	.759		.981	
DF	10		6	
	Dependent variable was defined as the estimated residual of the 1973 Medicaid certification equation shown in Table E-7.		Dependent variable was defined as the estimated residual of the 1973 proprietary Medicaid certification equation shown in Table E-7.	

TABLE E-9

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE NUMBER OF MEDICAID CERTIFIED BEDS FOR STATES WITH FLAT-RATE SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.077	.192	.527	.293
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.581	.593	-1.033	.840
CSR	.080	.172	.255	.230
GRT	-.029	.135	.047	.207
FRA	.270	.244	.618	.346
R^2	.123		.353	
RSS	.387		.609	
DF	9		8	
	Dependent variable was defined as the estimated residual of the 1973 Medicaid certification equation shown in Table E-7. FRA was in logs.		Dependent variable was defined as the estimated residual of the 1973 proprietary Medicaid certification equation shown in Table E-7. FRA was in logs.	

- Medicare Certified Beds

Tables E-10 through E-12 report the results of regression equations using the number of Medicare certified beds in 1973 as the dependent variable. The results in these tables were also consistent across ownership categories; however, much less of the variance was explained here than in the Medicaid equations, Section 2 above. This may be due to the small average number of Medicare beds per nursing care beds (and its small variance) relative to the number of Medicaid beds. The representative state had more than 43 percent of its beds with nursing services certified for skilled Medicaid care, but only 23.5 percent were certified for Medicare patients.

The income variable (EINC) was highly significant and had the expected sign. Since the variable refers to per capita elderly income, and since Social Security payments constitute a large portion of elderly income, this variable simply reflects higher demand for Medicare certified care in states with larger Medicare-eligible residents. The other socioeconomic variable, the ratio of nonwhite to total elderly (PCTNW), also exhibited a highly significant positive effect on Medicare bed certification. The explanation of this result is not obvious. The lower income of nonwhites suggests a negative sign, since fewer earners qualified for Medicare benefits. On the other hand, eligibility for Medicare benefits may be so widespread that low income nonwhites can take advantage of this coverage and others rely on their own resources.

The Medicaid expenditure variable (MDEX) was insignificant; the variable capturing Medicare nursing care expenditures per recipient (MREX), however, yielded a perverse result. The type of reimbursement system (TRF) exhibited the correct sign, albeit statistically insignificant.

With respect to cost-related states, Table E-11 indicates that none of the results were significant. In this equation we expected states with Medicaid reimbursement systems similar to Medicare to have a larger proportion of beds certified for such patients since the additional costs of satisfying the reimbursement conditions of Medicare are thereby reduced. (Medicare is a retrospective system offering a return on equity, allowing accelerated depreciation formulas and requiring an audit-review process.) The results were not wholely consistent with that hypothesis.

The regression results for flat-rate states are displayed in Table E-12. The parameter estimates of the reimbursement elements were not significantly different from zero. The amount of the flat-rate payment was significant but appears to have the wrong sign. A higher Medicaid payment will induce firms to leave the Medicare market. The observed result may be the result of not fully specifying the econometric model.

TABLE E-10

RESULTS OF REGRESSION EQUATIONS FOR THE NUMBER OF MEDICARE CERTIFIED BEDS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.208	.152	.149	.118
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.084	.143	-.108	.112
PCTNW	.422**	.166	.344**	.130
EINC	.128**	.051	.112**	.040
MDEX	.023	.021	.010	.016
MREX	-.208*	.108	-.149*	.085
TRF	-.060	.041	-.034	.032
R^2	.346		.326	
RSS	.716		.441	
DF	42		42	
	Dependent variable was defined as the ratio of Medicare certified beds to nursing care beds in 1973. EINC, MDEX, and MREX were in thousands of dollars.		Dependent variable was defined as the ratio of Medicare certified beds to nursing care beds in proprietary facilities in 1973. EINC, MDEX, and MREX were in thousands of dollars.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-11

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE NUMBER OF MEDICARE CERTIFIED BEDS FOR STATES WITH COST-RELATED SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.126	.000	.094
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.002	.078	-.010	.058
PRO	.055	.058	.034	.043
ROE	-.061	.066	-.039	.049
FPR	-.092	.093	-.066	.070
ACCEL	.055	.054	.035	.040
TL	-.066	.055	-.049	.041
AUDIT	.068	.065	.056	.049
ORR	.002	.058	.010	.044
R^2	.191		.185	
RSS	.395		.221	
DF	24		24	
	Dependent variable was defined as the estimated residual of the 1973 Medicare certification equation shown in Table E-10.		Dependent variable was defined as the estimated residual of the 1973 proprietary Medicare certification equation shown in Table E-10.	

TABLE E-12

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE NUMBER OF MEDICARE CERTIFIED BEDS FOR STATES WITH FLAT-RATE SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.123	.000	.106
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.266*	.126	-.241**	.104
CSR	-.041	.084	-.017	.069
GRT	.054	.065	.064	.054
FRA	.022*	.011	.020**	.009
R^2	.419		.463	
RSS	.132		.091	
DF	12		12	
	Dependent variable was defined as the estimated residual of the 1973 Medicare certification equation shown in Table E-10.		Dependent variable was defined as the estimated residual of the 1973 proprietary Medicare certification equation shown in Table E-10.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

- Changes in Number of Medicare Beds, 1969-73

The only means of addressing the issue of changing numbers of certified beds between 1969 and 1973 lies in the Medicare data. Data on the change in Medicaid bed certification were not available. The results of the regression equations employing the Medicare data are found in Tables E-13 through E-15.

Results were reported for both proprietary and all facilities. There was, on average, no discernible difference in the change in Medicare certified beds as a function of the type of reimbursement system. This conclusion follows from the statistical insignificance of the TRF variable.

As for other variables, neither elderly per capita income (EINC), nor Medicare and Medicaid skilled nursing expenditures per recipient (MREX and MDEX respectively) had significant impacts on changes in bed certification, 1969-73. The only statistically significant results were obtained from the racial mix and utilization rate variables. States with a higher percentage of nonwhite elderly (PCTNW) experienced less growth, or in fact, sharper declines in the number of certified Medicare beds than did other states. Comparing these results with those in the cross section equations of Table E-10 suggests that while states with a relatively large nonwhite population had a higher proportion of Medicare certified beds in 1973, that proportion has been falling more rapidly than in more racially homogeneous states. States with higher utilization rates (ORT) had a smaller decrease in the number of Medicare certified beds. (Note that the mean of the dependent variable is negative.) This result can only be deemed "suggestive" since the utilization rate is surely endogenous in a fully specified model of the nursing home industry.

Tables E-14 and E-15 report the results for states with cost-related and with flat-rate reimbursement systems. The most interesting result, again, was the lack of any pattern of statistically significant results. This reinforces further the conclusion that specific elements of reimbursement systems do not, by themselves, have important impacts on the industry.

TABLE E-13

RESULTS OF REGRESSION EQUATIONS FOR THE 1969-73 CHANGE IN THE NUMBER OF MEDICARE CERTIFIED BEDS, BY TYPE OF FACILITY OWNERSHIP

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	- .222	.155	- .178	.130
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-2.082**	.681	-1.712**	.568
PCTNW	- .550**	.173	- .394**	.144
EINC	- .026	.052	- .044	.043
MDEX	.006	.021	.003	.018
MREX	.104	.117	.157	.098
ORT	2.096**	.758	1.744**	.632
TRF	.014	.043	.012	.036
R^2	.347		.355	
RSS	.739		.513	
DF	41		41	
	Dependent variable was defined as the change in the ratio of Medicare certified beds to nursing care beds from 1969 to 1973. EINC, MDEX, and MREX were in thousands of dollars.		Dependent variable was defined as the change in the ratio of Medicare certified beds to nursing care beds in proprietary facilities from 1969 to 1973. EINC, MDEX, and MREX were in thousands of dollars.	

**Significant at the 95% confidence level.

TABLE E-14

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN THE NUMBER OF MEDICARE CERTIFIED BEDS FOR STATES WITH COST-RELATED SYSTEMS, BY TYPE OF FACILITY OWNERSHIP

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.133	.000	.111
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.032	.077	.046	.060
PRO	.063	.057	.037	.044
ROE	.026	.065	..020	.051
FPR	-.036	.092	-.072	.072
ACCEL	.059	.053	.030	.041
TL	.047	.054	.067	.042
AUDIT	-.150**	.064	-.147**	.050
ORR	.011	.057	.011	.449
R^2	.295		.381	
RSS	.384		.235	
DF	24		24	
	Dependent variable was defined as the estimated residual of the change in Medicare certification equation shown in Table E-13.		Dependent variable was defined as the estimated residual of the proprietary change in Medicare certification equation shown in Table E-13.	

**Signficant at the 95% confidence level.

TABLE E-15

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN THE NUMBER OF MEDICARE CERTIFIED BEDS FOR STATES WITH FLAT-RATE SYSTEMS, BY TYPE OF FACILITY OWNERSHIP

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.114	.000	.094
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.087	.344	-.106	.286
CSR	.044	.097	.056	.081
GRT	-.065	.076	-.039	.063
FRA	.040	.143	.045	.119
R^2	.082		.076	
RSS	.178		.123	
DF	12		12	
	Dependent variable was defined as the estimated residual of the change in Medicare certification equation shown in Table E-13. FRA was in logs.		Dependent variable was defined as the estimated residual of the proprietary change in Medicare certification equation shown in Table E-13. FRA was in logs.	

- Source of Funding

Certified Medicaid or Medicare beds need not be filled with patients classified to receive such care. The question logically arises whether Medicaid reimbursement policies differentially affected the composition of funding sources of patients in the nation's nursing homes. Tables E-16 through E-18 address this question.

Table E-16 presents the results of regression equations for the ratio of Medicaid-skilled care residents to total residents in 1973. The analysis suggests that states with flat-rate reimbursement systems (TRF), on average, had a higher proportion of Medicaid residents. However, this result was not statistically significant. The control variables generally behaved as expected. Larger Medicaid expenditures per recipient (MDEX) led to higher Medicaid ratios. A larger Medicare expenditure per recipient (MREX) decreased the ratio of Medicaid to total residents by inducing nursing care facilities to substitute Medicare residents for Medicaid (and private pay) residents. As with the certification equations in subsections 2 and 3 above, the larger the proportion of nonwhites (PCTNW) the larger was the ratio of Medicaid residents. The income variable (EINC) was not statistically significant. The equations, however, do explain over 50 percent of the variance in the dependent variable.

The results of regression equations using a source of funding dependent variable and dealing with reimbursement policies in states with cost-related systems are shown in Table E-17. The results were generally as hypothesized for the capacity equations in the text of Part II. The presence of an audit system (AUDIT) was significant at the 95 percent confidence level; unfortunately the sign does not confirm expectations. Table E-18 reports the results for states with flat-rate systems. The results do not allow us to reject the null hypothesis that these elements had no differential impact on the unexplained residual of the Medicaid source of funding equations.

TABLE E-16

RESULTS OF REGRESSION EQUATIONS FOR RESIDENTS WITH MEDICAID FUNDING, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	-1.810	1.170	-1.945	1.357
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-8.962	7.704	-19.370*	9.658
PCTNW	.171	.161	.077	.183
EINC	.092	.971	1.617	1.240
MDEX	1.673**	.341	1.851**	.382
MREX	- .904	.643	- 1.447*	.805
TRF	.161	.316	.239	.366
R^2	.504		.558	
RSS	25.800		27.681	
DF	33		29	
	Dependent variable was defined as the 1973 ratio of Medicaid-skilled residents to total residents in logs. All independent variables were in logs with the exception of TRF.		Dependent variable was defined as the 1973 ratio of Medicaid-skilled residents to total residents in proprietary facilities in logs. All independent variables were in logs with the exception of TRF.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-17

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF RESIDENTS WITH MEDICAID FUNDING FOR STATES WITH COST-RELATED SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.043	.192	.041	.202
Independent[a]	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.038	.105	.064	.116
PRO	-.079	.100	-.046	.111
ROE	-.041	.101	-.040	.125
ACCEL	.009	.088	.002	.118
TL	-.157	.110	-.244*	.116
AUDIT	.267**	.127	.290*	.138
ORR	-.090	.100	-.091	.130
R^2	.222		.277	
RSS	.688		.622	
DF	18		15	
	Dependent variable was defined as the estimated residual of the 1973 ratio of Medicaid-skilled residents to total residents shown in Table E-16.		Dependent variable was defined as the estimated residual of the 1973 ratio of Medicaid-skilled residents to total residents in proprietary facilities shown in Table E-16.	

[a] In these equations, the fixed profit rate provision (FPR) has been omitted.

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-18

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF RESIDENTS WITH MEDICAID FUNDING FOR STATES WITH FLAT-RATE SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.037	.181	.015	.217
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.406	.542	.051	.698
CSR	.165	.155	.124	.202
GRT	.080	.121	.044	.159
FRA	.164	.223	-.028	.287
R^2	.155		.047	
RSS	.360		.537	
DF	10		9	
	Dependent variable was defined as the estimated residual of the 1973 ratio of Medicaid-skilled residents to total residents shown in Table E-16. FRA was in logs.		Dependent variable was defined as the estimated residual of the 1973 ratio of Medicaid-skilled residents to total residents in proprietary facilities shown in Table E-16. FRA was in logs.	

- Quality of Nursing Services

It can be argued that Medicaid reimbursement policies have differential impacts on the change in the quality of nursing services and the average level of that quality across states. The next two sets of results address this issue. The results of these analyses were consistent with the hypothesis that flat-rate states provide lower quality care. The coefficients were not statistically significant, however.

"Quality of care" has a straightforward, intuitive meaning. Operationally, however, no single measure has yet captured the essence of that intuition. Data restrictions limited us to a quality measure based on skilled nursing personnel. As discussed in Appendix A, quality was defined as the ratio of nursing staff to occupied beds in the state. The nursing staff consisted of full-time registered nurses (RNs) and licensed practical nurses (LPNs). The ratio of the national mean annual salary of RNs and LPNs was used to convert RNs into LPN equivalents. Further, three categories of facilities have been employed in the analysis. Only the results from the equations using data on all facilities will be discussed, since the other equations provided less useful results.

Changes in the Quality of Nursing Services, 1969-73. Those states with flat-rate systems did not, on average, experience as large an increase in quality as did states with cost-related systems. This result was not statistically significant. The coefficient and sign of the income variable suggest that quality is a normal good; i.e., higher income results in increased (improved) quality of nursing care. Surprisingly, the larger the proportion of nonwhites in the elderly population the more quality had increased. While such a result may arise from lower initial quality levels in those states, the results reported below related to quality levels in 1973 were not consistent with that hypothesis.

The results displayed in Table E-20 are generally consistent with expectations. Cost-related systems that relate the amount of reimbursement to additional inputs should result in larger measured quality. Thus a per patient day profit payment should result in a smaller increase in quality than does a payment tied to operating cost. FPR, the flat-profit payment, and AUDIT, the existence of a review and audit system were inconsistencies. The coefficient estimates of these variables, as well as virtually all the others, were not significant at the 90 percent confidence level. Similarly, the results of the flat-rate reimbursement system equations, Table E-21, are not statistically significant, though CSR, the patient-specific payment, and FRA, the amount of the flat-rate payment are of the expected sign.

Level of Quality of Care, 1973. Turning to the interstate differences in the quality of nursing services in 1973, there appears to be anecdotal evidence to suggest that flat-rate states provide lower quality of care than do states with cost-related reimbursement systems. The negative coefficients for TRF shown in Table E-22 support that conclusion. The magnitude of the coefficient, however, was small and not significant at the 90 percent confidence level. The effect of income (EINC) was consistent with the belief that quality of care is a normal good. As noted above, the proportion of the elderly population that is non-white yields a result inconsistent with the "lower group income" hypothesis.

The results for cost-related and flat-rate reimbursement elements are presented in Tables E-23 and E-24 respectively. Again the elements are statistically insignificant, suggesting that specific reimbursement elements do not differentially affect the quality of care received in nursing homes.

TABLE E-19

RESULTS OF REGRESSION EQUATIONS FOR THE 1969-73 CHANGE IN QUALITY OF NURSING SERVICES, BY CATEGORY OF FACILITIES

Variable	All Facilities		Proprietary Facilities		Medicare Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	.018	.018	-.027	.016	.034	.131
Independent	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.016	.015	-.001	.015	.006	.129
PCTNW	.074**	.019	-.016	.019	.072	.162
EINC	.010*	.005	-.010*	.005	.011	.045
TRF	-.004	.005	.009*	.005	-.030	.042
R^2	.271		.121		.017	
RSS	.011		.011		.792	
DF	44		44		44	
	Dependent variable was defined as the 1969-73 change in the ratio of weighted nursing staff to occupied beds. EINC was in thousands of dollars.		Dependent variable was defined as the 1969-73 change in the ratio of weighted nursing staff to occupied beds in proprietary facilities. EINC was in thousands of dollars.		Dependent variable was defined as the 1969-73 change in the ratio of weighted nursing staff to occupied Medicare beds in Medicare certified facilities. EINC was in thousands of dollars.	

*Significant at the 90% confidence level.
**Significant at the 95 % confidence level.

TABLE E-20

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN QUALITY OF NURSING SERVICES FOR STATES WITH COST-RELATED SYSTEMS, BY CATEGORY OF FACILITIES

Variable	All Facilities		Proprietary Facilities		Medicare Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.017	.000	.016	.000	.149
Independent	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.0004	.010	-.006	.010	-.119	.091
PRO	-.001	.007	.011	.007	.030	.068
ROE	.004	.008	-.001	.008	.162**	.078
FPR	.009	.012	.005	.012	.150	.110
ACCEL	.0005	.007	.004	.007	-.051	.063
TL	-.020**	.007	-.006	.007	-.017	.065
AUDIT	.009	.008	.010	.008	.042	.077
ORR	-.002	.007	-.006	.007	-.053	.068
R^2	.291		.166		.211	
RSS	.007		.006		.546	
DF	24		24		24	
	Dependent variable was defined as the estimated residual of the change in the ratio of weighted nursing staff to occupied beds in Table E-19.		Dependent variable was defined as the estimated residual of the change in the ratio of weighted nursing staff to occupied beds in proprietary facilities shown in Table E-19.		Dependent variable was defined as the estimated residual of the change in the ratio of weighted nursing staff to occupied Medicare beds in Medicare certified facilities shown in Table E-19.	

**Significant at the 95% confidence level.

TABLE E-21

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN QUALITY OF NURSING SERVICES FOR STATES WITH FLAT-RATE SYSTEMS, BY CATEGORY OF FACILITIES

Variable	All Facilities		Proprietary Facilities		Medicare Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.011	.000	.014	.000	.082
Independent	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.004	.032	.014	.044	-.104	.242
CSR	.002	.009	.004	.012	.075	.068
GRT	-.007	.007	.0003	.010	-.029	.053
FRA	.002	.013	-.006	.018	.042	.100
R^2	.096		.026		.123	
RSS	.002		.003		.088	
DF	12		12		12	
	Dependent variable was defined as the estimated residual of the change in the ratio of weighted nursing staff to occupied beds shown in Table E-19. FRA was in logs.		Dependent variable was defined as the estimated residual of the change in the ratio of weighted nursing staff to occupied beds in proprietary facilities shown in Table E-19 FRA was in logs.		Dependent variable was defined as the estimated residual of the change in the ratio of weighted nursing staff to occupied Medicare beds in Medicare certified facilities shown in Table E-19. FRA was in logs.	

TABLE E-22

RESULTS OF REGRESSION EQUATIONS FOR QUALITY OF NURSING SERVICES, BY CATEGORY OF FACILITIES, 1973

Variable	All Facilities		Proprietary Facilities		Medicare Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	.097	.027	.095	.027	.275	.106
Independent	Coefficient	Standard Error	Coeffi-	Standard Error	Coefficient	Standard Error
CONSTANT	.017	.023	.046*	.026	.288**	.112
PCTNW	.086**	.029	.020	.033	.004	.131
EINC	.027**	.008	.018*	.009	.010	.038
TRF	-.011	.008	-.007	.008	-.050	.032
STH	—	—	—	—	-.075*	.039
R^2	.275		.085		.170	
RSS	.025		.032		.442	
DF	44		44		43	
	Dependent variable was defined as the 1973 ratio of weighted nursing staff to occupied beds. EINC was in thousands of dollars.		Dependent variable was defined as the 1973 ratio of weighted nursing staff to occupied beds in proprietary facilities. EINC was in thousands of dollars.		Dependent variable was defined as the 1973 ratio of weighted nursing staff to occupied beds in proprietary facilities.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-23

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF QUALITY OF NURSING SERVICES FOR STATES WITH COST-RELATED SYSTEMS, BY CATEGORY OF FACILITIES, 1973

Variable	All Facilities		Proprietary Facilities		Medicare Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.025	.000	.026	.000	.111
Independent	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.017	.015	-.020	.017	.061	.065
PRO	-.003	.011	.0004	.012	-.055	.049
ROE	.003	.013	.007	.014	-.015	.056
FPR	.015	.018	.013	.020	-.051	.079
ACCEL	.013	.011	.013	.012	-.066	.045
TL	-.019*	.011	-.011	.012	-.010	.046
AUDIT	.017	.013	.010	.014	.062	.055
ORR	.010	.011	.012	.013	-.096*	.049
R^2	.228		.136		.250	
RSS	.015		.019		.281	
DF	24		24		24	
	Dependent variable was defined as the estimated residual of the 1973 ratio of weighted nursing staff to occupied beds shown in Table E-22.		Dependent variable was defined as the estimated residual of the 1973 ratio of weighted nursing staff to occupied beds in proprietary facilities shown in Table E-22.		Dependent variable was defined as the estimated residual of the 1973 ratio of weighted nursing staff to occupied Medicare beds in Medicare certified facilities shown in Table E-22.	

*Significant at the 90% confidence level.

TABLE E-24

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF QUALITY OF NURSING SERVICES FOR STATES WITH FLAT-RATE SYSTEMS, BY CATEGORY OF FACILITIES, 1973

Variable	All Facilities		Proprietary Facilities		Medicare Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.019	.000	.027	.000	.064
Independent	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.042	.054	-.041	.080	.273	.156
CSR	-.012	.015	-.011	.023	.034	.044
GRT	-.019	.012	-.017	.018	-.036	.034
FRA	.020	.022	.019	.033	-.111	.065
R^2	.210		.094		.409	
RSS	.004		.010		.037	
DF	12		12		12	
	Dependent variable was defined as the estimated residual of the 1973 ratio of weighted nursing staff to occupied beds shown in Table E-22. FRA was in logs.		Dependent variable was defined as the estimated residual of the 1973 ratio of weighted nursing staff to occupied beds in proprietary facilities shown in Table E-22. FRA was in logs.		Dependent variable was defined as the estimated residual of the 1973 ratio of weighted nursing staff to occupied Medicare beds in Medicare certified facilities shown in Table E-22. FRA was in logs.	

Facility Size

Both change in facility size, 1969-73, and the average size of facilities in 1973 were used as dependent variables.

Change in Facility Size, 1969-73. In 1973 an average nursing home facility had a bed capacity of 61.6 beds. Over the period 1969 to 1973 this average facility size had grown by nearly 12 beds. We examined whether this change in bed capacity per facility was related to elements of reimbursement policy, since reimbursement systems affect the profitability of nursing home investment relative to alternative choices. For example, reimbursement policies that were directly related to the cost of services provided inducements to nursing homes to offer intensive/rehabilitative service bundles, typically in small, specialized facilities. Flat-rate systems provide an inducement to forego such specialized, intensive service patterns and to provide services more closely associated with custodial care.

Tables E-25 through E-27 present the results of regression estimates for the change in average facility size in relation to reimbursement policies. As shown in Table E-25, the type of reimbursement system (TRF) was associated with the change in average facility size. Facilities in states with flat-rate reimbursement systems, on average, increased their bed capacity by over four units per facility more than their counterparts in states with cost-related reimbursement systems. The coefficient of TRF was significant at the 90 percent confidence level. The results were thus consistent with the hypothesis expressed above.

As for other variables, states with larger urban populations (SMSA) had slightly larger facilities, although the coefficients were not statistically significant. On average, states categorized as "Southern" by the Bureau of the Census (STH) had larger facilities than did other states. Finally, notice that here, as in most of the National Study findings, the "proprietary facilities" equation did not perform as well as the equation using data on all forms of facility ownership.

The results of the regression equation for cost-related systems, shown in Table E-26, provide some interesting though not statistically significant findings. With respect to enforcement, an audit system (AUDIT) limited the growth in average bed size. The magnitude and significance of this result might follow from the tendency of regulatory bodies to concentrate effort on larger facilities. Occupancy rate regulation (ORR) decreased the growth in facility size. Total payment limits (TL) seem to be acting in a fashion analogous to flat-rate systems, i.e., inducing firms to substitute into less rehabilitative and more custodial care, resulting in a shift toward larger facilities where the latter type of care may predominate. If our hypothesis about the relationship between intensity of service and facility size is correct, the excluded capital payment category (payment as a percentage of cost) should result in smaller facilities than states offering return on equity (ROE) or fixed profit rates (FPR), although the result for FPR does not support our supposition. Further, the result for states allowing accelerated depreciation (ACCEL) is perverse, since accelerated depreciation encourages capital investment in, among other things, larger facilities. Finally, states with prospective systems (PRO) show a tendency to grow at a more rapid rate, though the difference is not statistically significant. Since prospective cost-related systems have important features in common with flat-rate systems, this result is not unexpected.

Change in average facility size in flat-rate states showed no relationship to any of the explanatory variables, as is apparent from the large standard errors reported in Table E-27.

Average Facility Size, 1973. The results for 1973 interstate differences in average facility size are reported in Tables E-28 through E-30. The results and their interpretation were consistent with those described for the change equations reported above. The only differences lie in the proprietary facilities equations. The signs of the coefficient for ROE and TL in Table E-29 and on GRT in Table E-30 are opposite to those reported earlier. In no case are these statistically significant coefficients, however.

TABLE E-25

RESULTS OF REGRESSION EQUATIONS FOR THE 1969-73 CHANGE IN AVERAGE FACILITY SIZE, BY TYPE OF FACILITY OWNERSHIP

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	11.839	8.162	12.487	9.572
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	6.432**	2.845	9.021**	3.524
SMSA	.052	.047	.035	.058
STH	3.573	2.395	1.511	2.968
TRF	4.328*	2.484	3.281	3.078
R^2	.146		.047	
RSS	2672.59		4102.64	
DF	44		44	
	Dependent variable was defined as the change in the ratio of beds to facilities from 1969 to 1973.		Dependent variable was defined as the change in the ratio of proprietary beds to proprietary facilities from 1969 to 1973.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-26

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN AVERAGE FACILITY SIZE FOR STATES WITH COST-RELATED SYSTEMS, BY TYPE OF FACILITY OWNERSHIP

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	8.108	.000	9.860
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	5.361	4.507	5.706	6.000
PRO	2.886	3.341	4.330	4.448
ROE	4.678	3.832	4.572	5.101
FPR	- 3.546	5.416	-3.072	7.210
ACCEL	- 3.950	3.112	-5.626	4.143
TL	2.501	3.195	1.355	4.253
AUDIT	-10.751**	3.788	-8.810*	5.043
ORR	- .434	3.383	-2.275	4.504
R^2	.346		.216	
RSS	1332.41		2361.31	
DF	24		24	
	Dependent variable was defined as the estimated residual of the change in the ratio of beds to facilities shown in Table E-25.		Dependent variable was defined as the estimated residual of the change in the ratio of proprietary beds to proprietary facilities shown in Table E-25.	

**Significant at the 95% confidence level.

TABLE E-27

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN AVERAGE FACILITY SIZE FOR STATES WITH FLAT-RATE SYSTEMS, BY TYPE OF FACILITY OWNERSHIP

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	6.504	.000	8.520
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.412	5.994	11.013	10.738
CSR	2.510	5.390	1.747	7.161
GRT	- .371	4.400	1.040	5.575
FRA	- .055	.194	- .999	.919
R^2	.027		.113	
RSS	617.574		965.869	
DF	12		12	
	Dependent variable was defined as the estimated residual of the change in the ratio of beds to facilities shown in Table E-25.		Dependent variable was defined as the estimated residual of the change in the ratio of proprietary beds to proprietary facilities shown in Table E-25.	

TABLE E-28

RESULTS OF REGRESSION EQUATIONS FOR AVERAGE FACILITY SIZE, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	61.614	19.395	56.357	19.826
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	47.030**	6.592	42.710**	6.734
SMSA	.141	.108	.108	.111
STH	9.273	5.551	11.502**	5.671
TRF	11.813**	5.757	11.997**	5.881
R^2	.188		.189	
RSS	14352.5		14978.1	
DF	44		44	
	Dependent variable was defined as the 1973 ratio of beds to facilities.		Dependent variable was defined as the 1973 ratio of proprietary beds to proprietary facilities.	

**Significant at the 95% confidence level.

TABLE E-29

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF AVERAGE FACILITY SIZE FOR STATES WITH COST-RELATED SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	18.460	.000	19.420
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	10.805	10.187	10.639	11.374
PRO	19.067**	7.553	19.535**	8.433
ROE	1.439	8.661	- 4.511	9.670
FPR	-13.086	12.242	- 9.958	13.668
ACCEL	-14.491*	7.036	-12.323	7.855
TL	4.060	7.222	- 1.340	8.063
AUDIT	-11.241	8.564	- 2.757	9.561
ORR	- 4.278	7.647	- 5.928	8.538
R^2	.356		.274	
RSS	6807.99		8486.21	
DF	24		24	
	Dependent variable was defined as the estimated residual of the 1973 ratio of beds to facilities shown in Table E-28.		Dependent variable was defined as the estimated residual of the 1973 ratio of proprietary beds to proprietary facilities shown in Table E-28.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-30

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF AVERAGE FACILITY SIZE FOR STATES WITH FLAT-RATE SYSTEMS, BY TYPE OF FACILITY OWNERSHIP, 1973

Variable	All Facilities		Proprietary Facilities	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	15.892	.000	14.803
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	9.280	19.694	7.300	18.515
CSR	7.661	13.133	9.627	12.374
GRT	-8.056	10.225	-4.480	9.613
FRA	- .715	1.686	- .686	1.585
R^2	.142		.126	
RSS	3248.84		2871.63	
DF	12		12	
	Dependent variable was defined as the estimated residual of the 1973 ratio of beds to facilities shown in Table E-28.		Dependent variable was defined as the estimated residual of the 1973 ratio of proprietary beds to proprietary facilities shown in Table E-28.	

- Number of Facilities

Tables E-31 through E-33 present the results of equations estimating the effects of reimbursement systems on the number of facilities in 1973 and the change in the number of those facilities from 1969 to 1973. The equations were intended to provide supporting information for the bed capacity equations presented in the text of Part II. The conclusion drawn from the type of reimbursement system variable (TRF) was certainly consistent with the results obtained there. At the 90 percent confidence level one cannot reject the hypothesis that on average there is no difference in either the interstate growth or number of nursing homes across reimbursement systems.

The other control variables imply that southern states have fewer facilities per thousand elderly and experienced a smaller increase in facilities. Higher utilization rates (ORT) were associated with a larger number of facilities but a smaller increase in the number of facilities. A larger proportion of a state's elderly residing in mental facilities (MRT) implied fewer facilities in 1973 but more growth over the 1969-73 period. Higher income of the elderly (EINC) and a larger proportion of non-white elderly (PCTNW) were associated both with an increase in the number of facilities and with a larger number of facilities in 1973.

Since this set of equations looks at issues very similar to those examined by the equations in the text, a comparison of the results in the two cases is revealing. Tables E-32 and II-7 indicate ROE, AUDIT and ORR differ in the number of facilities/beds equations. Except for the effect of PRO on the number of facilities, however, none of these variables was statistically significant in the equations using number of facilities as the dependent variable. This suggests that the factors determining change in bed capacity are different from those determining change in number of facilities, at least for states with cost-related reimbursement systems. The results for flat-rate systems are presented in Table E-33. These, however, were consistent with the results presented in the text.

TABLE E-31

RESULTS OF REGRESSION EQUATIONS FOR 1969-73 CHANGE IN THE NUMBER OF FACILITIES AND FOR THE NUMBER OF FACILITIES IN 1973

Variable	Change, 1969-73		Facilities, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.073	.199	1.156	.560
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.366	.832	-2.627	2.526
PCTNW	.915**	.232	.848	.619
EINC	.0007	.069	.014	.188
MRT	.0007	.010	- .071*	.036
ORT	-.332	.877	4.570*	2.666
STH	-.191**	.721	- .548**	.202
TRF	-.076	.060	- .268	.164
R^2	.344		.389	
RSS	1.217		9.007	
DF	41		41	
	Dependent variable was defined as the change in the number of facilities per 1000 elderly population. EINC was in thousands of dollars.		Dependent variable was defined as the number of facilities per 1000 elderly population in 1973. EINC was in thousands of dollars.	

**Significant at the 95% confidence level.

TABLE E-32

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF 1969-73 CHANGE IN THE NUMBER OF FACILITIES AND THE NUMBER OF FACILITIES IN 1973, FOR STATES WITH COST-RELATED SYSTEMS

Variable	Change, 1969-73		Facilities, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.156	.000	.454
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.042	.090	.026	.266
PRO	-.100	.067	-.451**	.197
ROE	-.007	.077	.208	.226
FPR	-.070	.109	.070	.319
ACCEL	-.031	.062	.028	.183
TL	-.126*	.064	-.125	.188
AUDIT	.087	.076	-.046	.223
ORR	.022	.068	.040	.199
R^2	.287		.276	
RSS	.536		4.628	
DF	24		24	
	Dependent variable was defined as the estimated residual of the change in the number of facilities per 1000 elderly population shown in Table E-31.		Dependent variable was defined as the estimated residual of the 1973 number of facilities per 1000 elderly population shown in Table E-31.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-33

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF 1969-73 CHANGE IN THE NUMBER OF FACILITIES AND THE NUMBER OF FACILITIES IN 1973, FOR STATES WITH FLAT-RATE SYSTEMS

Variable	Change, 1969-73		Facilities, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.176	.000	.418
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.512	.493	1.019	1.136
CSR	.182	.139	-.172	.321
GRT	.104	.108	.470*	.250
FRA	.192	.204	-.462	.471
R^2	.217		.259	
RSS	.365		1.941	
DF	12		12	
	Dependent variable was defined as the estimated residual of the change in the number of facilities per 1000 elderly population shown in Table E-31. FRA was in logs.		Dependent variable was defined as the estimated residual of the 1973 number of facilities per 1000 elderly population shown in Table E-31. FRA was in logs.	

*Significant at the 90% confidence level.

- Ratio of Proprietary Beds to Total Beds

The final set of tables reports the effects of reimbursement elements on the ratio of proprietary to total beds. Again the most significant finding was the lack of statistically significant coefficients with respect to types of reimbursement systems (TRF, Table E-34, or cost-related reimbursement policy elements, Table E-35).

Table E-36, on flat-rate reimbursement elements, does provide some statistically meaningful results for the change in the ownership ratio from 1969 to 1973. It appears that larger flat-rate payments resulted in a larger proportion of proprietary beds. Further, flat-rates pegged to the level of patient services also resulted in an increase in the relative number of proprietary beds in flat-rate states.

TABLE E-34

RESULTS OF REGRESSION EQUATIONS FOR 1969-73 CHANGE IN THE RATIO OF PROPRIETARY TO TOTAL BEDS AND THE 1973 RATIO OF PROPRIETARY TO TOTAL BEDS

Variable	Change, 1969-73		Ratio, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	-.038	.060	.633	.143
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.018	.066	.408**	.154
PCTNW	-.158**	.077	-.022	.179
EINC	-.001	.022	.062	.052
STH	.009	.023	.102*	.053
TRF	-.009	.019	.064	.044
R^2	.098		.142	
RSS	.151		.824	
DF	43		43	
	Dependent variable was defined as the change in the ratio of proprietary to total beds. EINC was in thousands of dollars.		Dependent variable was defined as the 1973 ratio of proprietary to total beds. EINC was in thousands of dollars.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-35

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN THE RATIO OF PROPRIETARY TO TOTAL BEDS AND THE 1973 RATIO OF PROPRIETARY TO TOTAL BEDS FOR STATES WITH COST-RELATED SYSTEMS

Variable	Change, 1969-73		Ratio, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.062	.000	.139
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	.0006	.102	-.039	.079
PRO	.0005	.028	.006	.058
ROE	-.002	.026	-.104	.067
FPR	-.043	.036	.070	.095
ACCEL	-.021	.024	.049	.054
TL	.056	.026	-.066	.056
AUDIT	-.036	.031	.121*	.066
ORR	.029	.026	.049	.059
R^2	.227		.318	
RSS	092		.408	
DF	24		24	
	Dependent variable was defined as the estimated residual of the change in the ratio of proprietary to total beds shown in Table E-34.		Dependent variable was defined as the estimated residual of the 1973 ratio of proprietary to total beds shown in Table E-34.	

*Significant at the 90% confidence level.

TABLE E-36

RESULTS OF REGRESSION EQUATIONS FOR RESIDUALS OF THE 1969-73 CHANGE IN THE RATIO OF PROPRIETARY TO TOTAL BEDS AND THE 1973 RATIO OF PROPRIETARY TO TOTAL BEDS FOR STATES WITH FLAT-RATE SYSTEMS

Variable	Change, 1969-73		Ratio, 1973	
Dependent	Mean	Standard Deviation	Mean	Standard Deviation
	.000	.046	.000	.123
Independent	Coefficient	Standard Error	Coefficient	Standard Error
CONSTANT	-.098*	.048	-.163	.152
CSR	.075**	.032	.116	.102
GRT	-.019	.025	.015	.079
FRA	.008*	.004	.013	.013
R^2	.396		.137	
RSS	.019		.194	
DF	12		12	
	Dependent variable was defined as the estimated residual of the change in the ratio of proprietary to total beds shown in Table E-34.		Dependent variable was defined as the estimated residual of the 1973 ratio of proprietary to total beds shown in Table E-34.	

*Significant at the 90% confidence level.
**Significant at the 95% confidence level.

TABLE E-37

SYMBOLS OF EXPLANATORY VARIABLES IN TABLES E-4 THROUGH E-6

Symbol	Explanatory Variable[a]
Reimbursement Variables	
ACCEL	Accelerated depreciation allowed
AUDIT	Review and audit system
CSR	Care specific rate
FPR	Fixed profit rate per patient day
FRA	Flat rate amount
GRT	Group rate
ORR	Occupancy rate regulation
PRO	Prospective
ROE	Return on equity
TL	Total payment limit
TRF	Type of reimbursement - flat
Control Variables	
CHPC3	Change in personal care without nursing beds per 1000 elderly
EINC	Per capita elderly income
MDEX	Medicaid skilled nursing expenditure per recipient
MREX	Medicare nursing expenditure per recipient
MRT	Elderly mental hospital residents per 1000 elderly
NPBD	Nonproprietary nursing beds per 1000 elderly
ORT	Occupancy rate
PCB	personal care without nursing beds per 1000 elderly
PCTNW	Percent elderly nonwhite
SMSA	Percent of state population living in Standard Metropolitan Statistical Areas
STH	South

[a] Precise definitions can be found in Appendix A.

TABLE E-38

ADJUSTED AVERAGE RATE OF RETURN FOR PROPRIETARY FACILITIES BY ABOVE AND BELOW MEDIAN VALUES OF CERTAIN FACILITY CHARACTERISTICS, BY STATE 1971-75

State and Median Values and Rate of Return	Number of Beds		Occupancy Rate		Debt / Total Assets		Equity / Total Asstes		PPD[a] / TPD	
Colorado										
Median	90		.898		.872		.140		NA	
	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below
Average Rate of Return	.114	.134	.132	.110	.109	.139	.138	.109	NA	NA
Standard Deviations	.106	.150	.097	.173	.114	.143	.141	.115	NA	NA
Georgia										
Median	86		.960		.824		.188		.164	
	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below
Average Rate of Return	.111	.096	.143	.066	.088	.120	.130	.079	.097	.111
Standard Deviations	.189	.095	.135	.154	.153	.145	.111	.176	.098	.187
New York										
Median	104		.977		.878		.122		.272	
	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below
Average Rate of Return	.090	.143	.111	.123	.055	.178	.181	.052	.173	.061
Standard Deviations	.230	.149	.170	.220	.215	.150	.145	.217	.152	.217
Washington										
Median	81		.937		.762		.311		.307	
	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below
Average Rate of Return	.138	.091	.123	.106	.094	.135	.135	.093	.133	.095
Standard Deviations	.126	.137	.142	.123	.152	.107	.107	.153	.120	.143

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[a] Data for the ratio of private patient days to total patients days was not available for Colorado.

C. State Studies Supplemental Tables

1. Rates of Return and Facility Characteristics.

In Table E-38, the adjusted average rates of return for proprietary facilities have been divided into two categories; those rates for facilities above the median value of certain facility characteristics, and those rates for facilities below the median value. The data were supplement to the material in Tables IV-7, 9, 10, 11.

2. Ownership Status by Type of Ownership.

We examined the simple average adjusted rates separately for proprietary corporate and noncorporate groups of nursing homes to confirm whether differences in rates existed between nursing homes that owned their facilities and those that leased their facilities within each group. Not many significant differences were observed between the groups of nursing homes examined as shown in Table E-39.

The difference in the State of Washington between owned and leased groups of nursing homes was found only among inforporated nursing homes and not among nursing homes thate were owned by sole proprietors and partnerships. This finding was consistent with the observed experience in the State of Washington when sale and leaseback arrangements were rampant [60]. There was an increase in the number of nursing homes that incorporated, in fact, incorporation of nursing homes and setting up of dummy corporations was an essential feature of the process by which sale and leaseback arrangements were achieved. The fact that we do not observe any difference in the computed average adjusted rates between owned and leased nursing homes in the noncorporate groups can be considered as an indirect confirmation of the validity of the adjusted rates of return proposed as approximations of real rates of return.

In comparison with results in the text it might be noted that evidence of somewhat higher returns to nursing homes in the noncorporate groups is again shown to hold for both owned and leased nursing homes with the exception of leased nursing homes in Georgia and Washington. The differences were significant, however, only for leased nursing homes in Colorado and Washington. Furthermore, the anomalous rate reported for leased nursing homes in Georgia is no doubt due to very small numbers of observations in that group (Table E-39). The fact that, in general, nursing homes that lease facilities

TABLE E-39

SIMPLE AVERAGE ADJUSTED OVERALL RATES OF RETURN FOR CORPORATE AND NONCORPORATE PROPRIETARY NURSING HOMES, BY OWNERSHIP STATUS OF FACILITIES AND BY STATE

1971-75

(Standard Errors in Parentheses)

State	Simple Average Adjusted Overall Rates of Return					
	Corporate			Noncorporate		
	Owned	Leased	Difference[a]	Owned	Leased	Difference[a]
Colorado	10.9 (1.1) n=74	9.2 (3.7) n=23	-16%	15.8[#] (1.8) n=36	30.6 (16.5) n=5	+ 94%
Georgia	10.0 (0.5) n=135	13.5 (4.5) n=40	+35%	11.4[#] (1.2) n=24	-29.1 (28.2) n=3	-355%
New York	8.6 (2.1) n=8	9.7 (3.4) n=16	+13%	13.3 (1.3) n=42	11.4 (3.6) n=61	- 14%
Washington	7.8[†] (0.7) n=85	15.2 (2.2) n=52	+95%*	12.5 (2.2) n=55	13.4 (4.0) n=19	+ 7%

[a] The difference in rates is a percentage of the "owned" rate.

[*] Rejected the hypothesis that the simple average adjusted rate of corporate nursing homes that owned and those that leased facilities are the same within a state at 95% level of confidence.

[†] Rejected the hypothesis that the simple adjusted rate of corporate proprietary nursing homes that own their facilities is the same as the simple average adjusted rate of corporate proprietary nursing homes that own their facilities in Colorado and Georgia at 95% level of confidence.

[#] Rejected the hypothesis that the simple average adjusted rate of noncorporate proprietary nursing homes that own their facilities in Georgia and Colorado are the same at 95% level of confidence.

make somewhat higher returns may be due to the fact that net income does not decline proportionately with the asset base and nursing homes that le lease facilities have less assets than those that own facilities.

Very few significant differences between states were observed. The average rate of return of corporate nursing homes that owned their facilities in the State of Washington was found to be significantly lower than the average rate for similar nursing homes in Colorado and Georgia respectively. In the noncorporate group, the only difference between states was observed in the case of Georgia and Colorado. The average rate of noncorporate nursing homes that owned their facilities in Colorado was higher than the average rate of similar nursing homes in Georgia.

In general, the examination of the average rates of return across nursing homes grouped by whether they own or lease their facilities yielded few significant differences between owned and leased groups within a state or between states. The evidence is consistent with what one might expect. The return to capital _per se_ should be independent of whether the assets are owned or leased.

Briefly, the findings of the examination of the computed adjusted rates of return by facility ownership states by note of ownership can be summarized as follows:

- Average adjusted individual facility rates of proprietary nursing homes for both owned and leased groups individually between states were not found to be significantly different from each other.
- Average adjusted individual facility rates of corporate proprietary nursing homes that own their facilities were not significantly different from each other in any of the four states except Washington. In Washington the leased group had a significantly higher rate of return than a similar average rate for the owned group.

Note that in spite of the fact that average rate of the leased group is 355 percent lower than that of the owned group in Georgia, the difference is not significant. It is because the three nursing homes in the leased group show a very large variation in average adjusted rates among them.

See text for discussion of the impact of the reimbursement system on rates of return for those homes that leased versus those that rented.

- Average adjusted individual facility rates of corporate proprietary nursing homes for both owned and leased groups individually between states were not found to be different from each other except in case of Washington. In Washington the corporate proprietary nursing homes that own their facilities has significantly lower average rates of return than the average rates of similar facilities in Georgia and Colorado.

- Average adjusted individual facility rates of nursing homes owned by sole proprietors and partnerships that own their facilities and those that lease their facilities were not significantly different from each other in any of the four states.

- Average adjusted individual facility rates on nursing homes owned by sole proprietors and partnerships for both owned and leased groups individually between states were not found to be significantly different from each other except in the case between Georgia and Colorado. The average rate for the owned group in Colorado was significantly higher than the average rate for the owned group in Georgia.

D. Supplemental Tables for Risk and Rates of Return Study

Table E-40 provides the beta values and related information for the twelve firms excluded from the analysis in Part IV. For the most part, these firms produced extreme values, and were excluded as discussed in the text.

TABLE E-40

BETA (β) VALUES, STANDARD ERRORS, AND NUMBER OF OBSERVATIONS FOR THE 12 MULTIFACILITY FIRMS NOT INCLUDED IN THE ANALYSIS IN PART IV

Name	Beta Value	Standard Error of Beta	Number of Observations
1. Nationwide Nursing Centers	3.79	3.354	43
2. Hy-Land Enterprises	2.01	1.305	44
3. Monterey Life Systems	1.75	.545	36
4. Nodaway Valley Packing	.88	.518	49
5. Care Inns (William Bond Inc.)	.29	.207	72
6. National Living Centers	.11	.965	30
7. Golden State Health Centers	-.03	.800	72
8. Mid-America Nursing Centers	-.06	.313	49
9. Medicalodges	-.16	.278	49
10. Retirement Living	-.20	.537	43
11. Congeneric Corporation	-.40	.830	24
12. Alliance Medical Industries	-.93	1.028	57

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